Vol. 935 Number 2

OFFICIAL GAZETTE

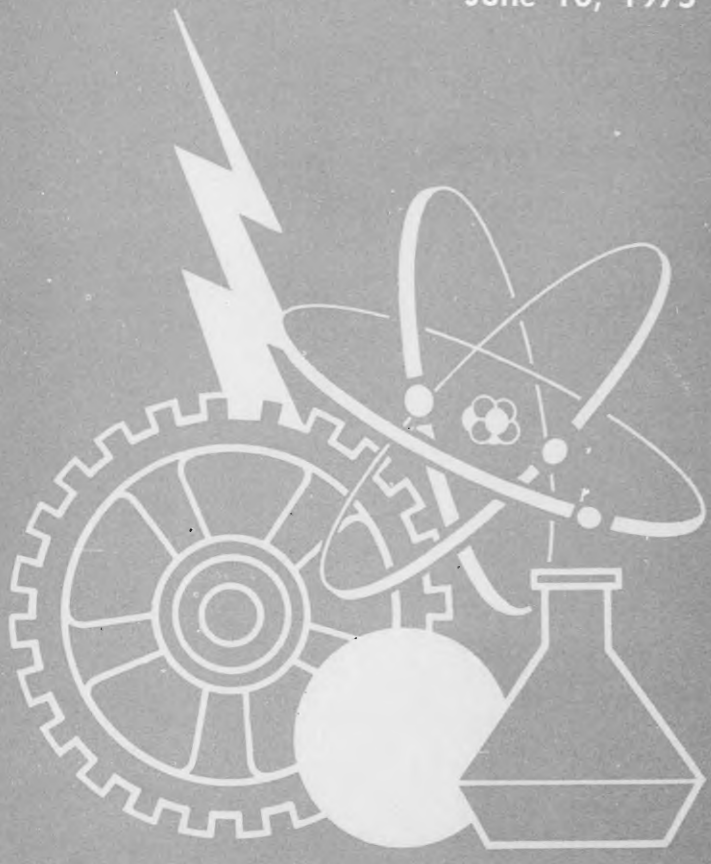
of the

UNITED STATES PATENT AND TRADEMARK OFFICE

AMOCO OIL CO
DEC 2 1975
RESEARCH LIBRARY

PATENTS

June 10, 1975



U.S.
DEPARTMENT
OF COMMERCE

Patent
and
Trademark
Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

June 10, 1975 Volume 935 Number 2

CONTENTS

	Page
Patent Notices	
International Industrial Property Protection Developments Report on Conferences Attended by Officials of U.S. Patent and Trademark Office	446
Disclaimers	448
Certificates of Correction for the Week of June 10, 1975	449
Dedication	449
Disclaimers and Dedications	449
Erratum	449
Patents Available for Licensing or Sale	449
Condition of Patent Applications	453
Reissue Patents Granted (28,443)	455
Plant Patents Granted (3,727)	460
Patents Granted	
General and Mechanical (3,887,946)	461
Chemical (3,888,623)	684
Electrical (3,889,042)	791
Design Patents Granted (235,283)	877
Index of Patentees	PI 1
Indices of Applicants of Reissues, Plants and Designs	PI 40
Classification of	
Patents (Including Reissues)	PI 43
Designs and Plants	PI 46
Geographical Index of Residence of Inventors	
Patents (Including Reissues)	PI 47
Designs and Plants	PI 49

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENTS SECTION), issued weekly, subscription $342.20 per annum, foreign mailing $85.55 additional; single copies $6.60 each.

THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly, subscription $88.40 per annum, foreign mailing $22.10 additional; single copies $1.70 each.

CIRCULARS OF GENERAL INFORMATION concerning PATENTS, price 60 cents each.

CIRCULARS OF GENERAL INFORMATION concerning TRADEMARKS, price 50 cents each.

PRINTED COPIES OF PATENTS are furnished by the Patent and Trademark Office at 50 cents each; PLANT PATENTS in color, $1.00 each; copies of TRADEMARKS and DESIGN PATENTS at 20 cents each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT OFFICE NOTICES

INTERNATIONAL INDUSTRIAL PROPERTY PROTECTION DEVELOPMENTS REPORTS ON CONFERENCES ATTENDED BY OFFICIALS OF U.S. PATENT AND TRADEMARK OFFICE

Representatives of the U.S. Patent and Trademark Office are frequent participants at international intergovernmental meetings where matters relating to industrial property protection are discussed. These include meetings on patent and trademark classification, mechanized information retrieval, assistance programs for developing countries, and periodic conferences pursuant to international treaties to which we are a party.

When the results of these deliberations have been of particular significance, for example, texts of new treaties such as the Patent Cooperation Treaty and the Trademark Registration Treaty, they have been made available to readers of the OFFICIAL GAZETTE *by publication of the relevant documents.*

To keep readers current on relevant international activities as they occur, even in their evolving state, more frequent status reports seem desirable.

We have in the past solicited views from the private sector on important issues by way of circular letters and questionnaires addressed to heads of organizations, industrial groups and patent law associations. We plan to continue using this method of communication.

In order that the entire readership of the OFFICIAL GAZETTE *be kept advised, however, we intend to publish from time to time summary reports of the more significant international meetings that we attend. The first such report follows.*

I am hopeful that this series will be helpful. Please do not hesitate to give us your views on the matters presented or your suggestions on how to improve the presentations of this series.

C. MARSHALL DANN,
Commissioner of Patents and Trademarks.

REPORT ON THE MEETING OF THE AD HOC GROUP OF GOVERNMENTAL EXPERTS ON THE REVISION OF THE PARIS CONVENTION, FEBRUARY 11 TO 17, 1975

This Ad Hoc Group of Governmental Experts was convened pursuant to a resolution of the Coordination Committee of WIPO adopted in September 1974, as follows:

> "The Director General will create and convene an Ad Hoc Group of Governmental Experts coming from states both members and non-members of the Paris Union to study all aspects to the question of revising the Paris Convention including, inter alia, additional provisions of special benefit to the developing countries."

The meeting was well attended; almost fifty countries were represented. Also represented were five intergovernmental organizations and nine international nongovernmental organizations.

The developing countries expressed concern that the systems of patent protection as currently practiced were hampering rather than facilitating the transfer of technology to them. Algeria, Cuba and the Ivory Coast were principal spokesmen. They pointed out that developing countries hold a very small percentage share of the total pool of patents and voiced the view that in too many instances enterprises of developed market economy countries were protecting their exports through the use of patents, to the detriment of industrialization objectives of developing countries.

Accordingly, their major attention was focussed on ways to avoid the utilization of patents in a manner considered by them "abusive" to interests of developing countries. In this regard, they identified a few areas which they thought possibly susceptible to correction by amendment of the Paris Convention.

A change in the national treatment clause of article 2 of the Paris Convention was suggested, based on the contention that the equality principle leads to unequal benefits. Support was expressed for "preferential treatment" for their nationals "without reciprocity." Developing countries urged that compulsory licensing be made available for use by developing countries at an earlier date than is now permitted under the Paris Convention. It was also suggested that a greater transfer of know-how associated with patented technology was needed to accomplish domestic working. Additionally, suggestions were made to exclude certain technological subject matter from the scope of coverage of patent grants and to reduce in certain instances the term of the patent grant.

The Socialist countries, with the Soviet Union as their chief spokesman, expressed a favorable disposition to a "modernization" of the Paris Convention which supported the aspirations of developing countries. They asserted the desirability of incorporating into the Paris Convention provisions for giving greater recognition to inventors' certificates, the principal incentive to inventors in Socialist countries. Another theme repeated by these countries was the desirability of extending industrial property protection provisions of the Convention to include scientific discoveries.

The developed market economy countries also expressed support for promoting the transfer of technology to the developing countries, but pointed out that careful analysis is needed to determine the best ways to accomplish this. In their view, the Paris Convention has been very successful since its inception in promoting international trade in industrial property and the Convention may well be sufficiently flexible to permit tackling the problems experienced by developing countries without amendment. In any event, the practical problems which are being experienced should be identified with greater precision and clarity so that the approaches developed would be suitable to meet the realities of the current situation.

Several developed market economy countries pointed out the practical reality that the technology which developing countries need is owned privately in industrialized countries. Therefore, the transfer of that technology can only be achieved when the owners of that technology are encouraged to transfer it to the recipient country in a commercial arrangement on mutually acceptable terms based on a comfortable working relationship between the parties.

Attention was also called to the fact that there are several alternative ways of assisting developing countries within the framework of the World Intellectual Property Organization. In particular, mention was made of the preparation of a new Model Law on Inventions, the technical assistance and technical information programs under Chapter 4 of the Patent Cooperation Treaty, and the activities of the Permanent Program for the Acquisition by Developing Countries of Technology Related to Industrial Property. It was also pointed out that some of the desires of the developing countries could be achieved by changes in their national laws, without change in the Paris Convention.

The group of experts after a full discussion adopted the following recommendation:

> "*The Ad Hoc Group of Governmental Experts on the Revision of the Paris Convention for the Protection of Industrial Property*, convened in accordance with the decisions taken at the September 1974 sessions of the Coordination Committee of the World Intellectual Property Organization (WIPO) and the Executive Committee of the Paris Union for the Protection of Industrial Property,
>
> "*Meeting* at Geneva from February 11 to 17, 1975,
>
> "*Noting* the interest that developing countries have manifested in the revision of the Paris Convention,
>
> "1. *Agrees* that, at this stage of the work, the following questions be considered:
>
> (i) National Treatment
> (ii) Independence of Patents

(iii) to (v) Non-Working and Delays in Working of the Patented Invention; Compulsory Licenses; Licenses of Right
(vi) Preferential Treatment Without Reciprocity
(vii) Technical Assistance
(viii) Types of Protection other than Patents (Inventors' Certificates, etc.)
(ix) Marks; Industrial Designs; Appellations of Origin
(x) Reservations
(xi) Deletion of Article 24
(xii) Scope of Protection of Process Patents
(xiii) Right of Priority
(xiv) Unanimity Rule

"2. *Recommends:*

(*a*) that the Director General, taking into account the need to respect the basic principles of the Paris Convention and to take into consideration the concerns of the developing countries, prepare a study containing an analysis of the issues and outlining possible alternative solutions in respect of the said points and any connected questions,

(*b*) that the report containing the said study be communicated to the Governments of all countries members of the United Nations system of organizations for their comments,

(*c*) that, as a continuation of the work towards the revision of the Paris Convention, the Ad Hoc Group of Governmental Experts be convened, as soon as possible, in a second session,

(*d*) that the competent organs of WIPO and the Paris Union and all other interested organizations, in particular the United Nations Conference on Trade and Development (UNCTAD) and the United Nations Industrial Development Organization (UNIDO), be informed of the results of the first (present) session of the Ad Hoc Group of Governmental Experts,

(*e*) that other United Nations bodies, particularly the United Nations Conference on Trade and Development and the United Nations Industrial Development Organization, interested in the transfer of technology be consulted as to the contribution they could make to the further work of the Ad Hoc Group of Governmental Experts."

The issues forming the basis of the fourteen questions, thirteen of substantive law and one of procedure mentioned in paragraph 1 of the resolution, were developed to some degree by the members of the Committee of Experts as follows:

"A. *Questions of Substantive Law*

"*Question No. 1: National Treatment.* It was generally understood that the principle of national treatment should remain unaffected in the relations between developed countries,* this term covering both market economy and Socialist countries which are not developing countries. The question here is rather whether, in the relations of developing countries to developed countries, national treatment should not, on certain points—yet to be identified—suffer exceptions totally or within certain limits also to be defined. The total exception to national treatment on certain points may require the definition of minimum standards of protection to be respected in any case. Whether such derogations from national treatment would apply also in the relations between developing countries would also have to be considered.

"The examples of possible cases where certain derogations from the national treatment principle were mentioned concerned smaller fees for nationals than foreigners, the requirements of working the patented invention on the territory of the developing country and the duration of the patent.

"Moreover, the question should be examined whether, in a case where an invention was made by a resident of the country or where an invention was worked in the country, national treatment should not apply unconditionally, irrespective of the nationality of the patentee of other person working the invention.

"*Question No. 2: Independence of Patents.* The question here is whether the principle of full independence embodied in Article 4*bis* of the Paris Convention should be maintained, or whether exceptions to it should be allowed, particularly where the foreign applicant in the developing country claims priority of an earlier foreign application on which no patent was issued because of lack of patentability or where the patent so granted was later invalidated for that reason. Furthermore, the question should be studied how decisions taken in respect of an invention in any foreign country could be made available to the national office of any developing country in which an application for that invention had been filed.

"*Questions Nos. 3 to 5: Non-Working and Delays in Working of the Patented Invention; Compulsory Licenses; Licenses of Right.* The questions here are whether any developing country should not be permitted to impose requirements for working the patented invention which are more stringent for foreigners than nationals, whether the time limits in Article 5A of the Paris Convention should not be shortened, whether licenses of right—whose concept still required precise definition—should not be allowed by the Paris Convention, and whether it should not be specified that importation did not satisfy the requirement of working in the country.

"*Question No. 6: Preferential Treatment Without Reciprocity.* The question here is whether in certain respects nationals of developing countries should not receive more favorable treatment in developed countries than nationals of the developed countries. One example was mentioned, that is, the fees to be paid: whether the amount of the fees charged for the application for, and maintenance of, a patent in a developed country should not be less than the fees to be paid by the nationals of countries which are not developing countries.

"*Question No. 7: Technical Assistance.* The question here is whether the Paris Convention should not contain provisions—similar, for example, to those contained in the Patent Cooperation Treaty—concerning technical assistance to developing countries. It was noted that under Article 7 of the Convention Establishing the World Intellectual Property Organization the institutional framework for such technical assistance existed but that budgetary considerations might militate in favor of including provisions on technical assistance also in the Paris Convention. It was suggested that Article 19 could be made use of in order to establish special unions devoted to technical assistance.

"*Question No. 8: Types of Protection Other than Patents (Inventors' Certificates, etc.).* The most important question here is whether inventors' certificates should not, as far as their legal nature so permits, be treated in the Paris Convention on an equal footing with patents and, consequently, expressly referred to in Article 1 and all other relevant provisions of that Convention. It was mentioned in this connection that the free choice, for foreigners on the same terms as for nationals, between patents and inventors' certificates would have to be consequently generalized. A further question here is whether inventors' certificates granted for industrial designs rather than technical inventions should also be expressly mentioned. Finally, the question of the inclusion in the text of the Paris Convention of references to special types of patents should be examined.

"*Question No. 9: Marks; Industrial Designs; Appellations of Origin.* Examples mentioned of questions to be considered here were: whether a more precise definition of the time limit mentioned in Article 5C(1) of the Paris Convention was not required in order to ensure early enforcement of any use requirements; whether the prohibition of the use of geographical designations as trademarks should not be established or, to the extent that it existed, reinforced; whether the protection of appellations of origin should not be reinforced and, in cases of

*The Delegation of Canada reserved its position as to this conclusion, and generally as to the possibilities of enlarging any proposed amendments which were appropriate for both developed and developing countries, so as to make them of universal application. The Director General indicated that amendments of benefit to all members States could be so enlarged.

conflict between an appellation of origin and a trademark, the former should not prevail; whether the protection against false indications of source and unfair competition in general should not be strengthened to allow for swifter action against abuses; whether the obligation to protect any well-known mark (*marque notoirement connue*) was always compatible with the interests of developing countries in which similar national marks were registered before the registration of the well-known mark; whether the possibility of providing for compulsory licenses for trademarks and industrial designs, in certain well-defined cases, should not be provided for; whether Article 6 of the Paris Convention concerning the independence of trademarks need not be revised; finally, whether the possibility of pronouncing the lapse of industrial designs, in certain well-defined cases, should not be provided for.

"Question 10: Reservations. The question here is whether any exception from the obligations of the Paris Convention allowed for developing countries should not be exercisable by way of a reservation to the relevant provision of that Convention. This could allow of a more flexible system, tailor-made for the needs of the country making reservations.

"Question No. 11: Deletion of Article 24. The question here is whether Article 24 of the Paris Convention has not become anachronistic and should not be deleted.

"Question No. 12: Scope of Protection of Process Patents. The question here is whether developing countries should not be exempted from the rule embodied in Article 5*quater* of the Paris Convention according to which the patentee has, with regard to imported products, all the rights which the process patent grants to him with respect to products manufactured in the country.

"Question No. 13: Right of Priority. All aspects of Article 4 of the Paris Convention should be examined, including the question whether the duration of the right of priority should not be longer for applicants who are nationals of developing countries when they apply for patents in developed countries.

"B. *Question of Procedure*

"Question No. 14: Unanimity Rule. The question here is to weigh the relative advantages and disadvantages of amending the Paris Convention by unanimity or a qualified majority."

These narrative synopses will form the basis for the study which the Director General will undertake as specified in paragraph 2(*a*) of the resolution. Following completion of the Director General's study, the report he prepares will be circulated to all member countries of the UN system of organizations for their comments and following receipt of these a second meeting of the Ad Hoc Group of Governmental Experts Concerning the Revision of the Paris Convention will be called. This may take place in the Spring of 1976.

Disclaimers

3,319,872.—*Irving C. Beckman* and *Alex Morrell Beerbohm*, Huntington Woods, Mich. MAILER. Patent dated May 16, 1967. Disclaimer filed Dec. 23, 1974, by the assignee, *2B System Corporation.*

Hereby disclaims the term of this patent subsequent to Sept. 20, 1983.

3,615,710.—*Yoon Chai Lee* and *Quirino A. Trementozzi*, Springfield, Mass. Patent dated Oct. 26, 1971. PACKAGING MATERIALS FOR COMESTIBLES. Disclaimer filed Dec. 5, 1973, by the assignee, *Monsanto Company.*

Hereby disclaims the term of this patent subsequent to June 24, 1986.

3,642,768.—*Joachim Ribka*, Offenbach (Main), Germany. WATER-INSOLUBLE PHENYL-AZO-NAPHTHOL DYESTUFFS. Patent dated Feb. 15, 1972. Disclaimer filed Oct. 25, 1974, by the assignee, *Hoechst Aktiengesellschaft.*

Hereby enters this disclaimer to claims 1 and 2 of said patent.

3,644,137.—*Maurice Raynor Fox, Neil David Stewart*, and *Alfred Peter Lockett*, Manchester, England. METHOD OF APPLYING PROCESSING LIQUORS TO TEXTILE MATERIALS AND APPARATUS THEREFOR. Patent dated Feb. 22, 1972. Disclaimer filed Aug. 19, 1974, by the assignee, *Imperial Chemical Industries Limited.*

Hereby enters this disclaimer to all claims of said patent.

3,658,892.—*Henry Martin*, Basel, and *Jacques Rufener*, Stein, Aargau, Switzerland, and *Georg Pissiotas*, Lorrach, Germany. DERIVATIVES OF N-PHENYLTHALAMIDE ACID USEFUL FOR REGULATING PLANT DEVELOPMENT. Patent dated Apr. 25, 1972. Disclaimer filed Dec. 4, 1974, by the assignee, *Ciba-Geigy A.G.*

Hereby enters this disclaimer to claims 1 through 7, inclusive, of said patent.

3,662,745.—*Louis Ciro Cosentino*, West Paterson, N.J. METAL-METAL SALT ELECTRODE AND METHOD FOR MAKING THE SAME. Patent dated May 16, 1972. Disclaimer filed Jan. 27, 1975, by the assignee, *Medtronic, Inc.*

Hereby enters this disclaimer to claim 1 of said patent.

3,664,118.—*Richard S. Walton*, Lancaster, Pa. ELECTRONICALLY CONTROLLED TIMEPIECE USING LOW POWER MOS TRANSISTOR CIRCUITRY. Patent dated May 23, 1972. Disclaimer filed Oct. 16, 1973, by the assignee, *Hamilton Watch Company.*

Hereby enters this disclaimer to claim 20 of said patent.

3,669,532.—*Edwin E. Figge*, Des Plaines, Ill., *Joseph H. Lancor, Jr.*, Arcadia, Calif., and *Edward H. Lodge*, Wilmette, Ill. PROJECTOR CONTROL APPARATUS. Patent dated June 13, 1972. Disclaimer filed Oct. 25, 1972, by the assignee, *Bell & Howell Company.*

Hereby enters this disclaimer to claims 1, 2, 3 and 4 of said patent.

3,673,681.—*James J. Steranko*, Weston, Mass. ELECTRICAL CIRCUIT BOARD WIRING. Patent dated July 4, 1972. Disclaimer filed Aug. 3, 1973, by the assignee, *Inforex, Inc.*

Hereby enters this disclaimer to claims 1–4 of said patent.

3,684,720.—*Darwin W. Richardson*, Richardson, Tex. REMOVAL OF SCALE FROM SURFACES. Patent dated Aug. 15, 1972. Disclaimer filed Sept. 28, 1973, by the assignee, *The Western Company.*

Hereby enters this disclaimer to claims 1–23, all of the claims, of said patent.

3,700,541.—*Ronald Horace Shrimpton*, Lichfield, and *Keith William Dunkley*, Birmingham, England. PRINTERS BLANKETS. Patent dated Oct. 24, 1972. Disclaimer filed Sept. 16, 1974, by the assignee, *Dunlop Holdings Limited.*

Hereby disclaims the entire remaining term of said patent.

3,736,197.—*Harold J. Messerschmidt*, Stockholm, *Karl Heyman*, Montclair, and *Bernadou W. Johnsen II*, Paterson, N.J. POWDERLESS ETCHING BATH COMPOSITIONS AND ADDITIVES. Patent dated May 29, 1973. Disclaimer filed July 10, 1973, by the assignee, *Mona Industries, Inc.*

Hereby disclaims the term of this patent subsequent to Apr. 3, 1990.

3,748,601.—*Harold Seidel*, Warren, N.J. COUPLING NETWORKS HAVING BROADER BANDWIDTH THAN INCLUDED PHASE SHIFTERS. Patent dated July 24, 1973. Disclaimer filed Sept. 13, 1973, by the assignee, *Bell Telephone Laboratories, Incorporated.*

Hereby enters this disclaimer to claim 1 of said patent.

3,756,521.—*Franz Werner*, Vienna, Austria. WINDING DEVICE FOR RECORDING AND/OR PLAY-BACK APPARATUS. Patent dated Sept. 4, 1973. Disclaimer filed Nov. 26, 1974, by the assignee, *U.S. Philips Corporation.*

Hereby enters this disclaimer to claims 1, 7, 8, 9 and 10 of said patent.

3,767,410.—*David Philip Brust* and *Grace Eileen Kane*, Rochester, N.Y. PHOTOGRAPHIC HYDROPHILIC COLLOIDS AND METHOD OF COATING. Patent dated Oct. 23, 1973. Disclaimer filed July 11, 1974, by the assignee, *Eastman Kodak Company.*

Hereby enters this disclaimer to claims 1, 2, 3 and 4 of said patent.

3,769,557.—*John Paul Jones, Jr.*, Wayne, Pa. ELECTROLYTIC TIME DELAY CAPSULE WITH PLASTIC CUP ELECTRODE HOLDER. Patent dated Oct. 30, 1973. Disclaimer filed Mar. 22, 1974, by the assignee, *Compuline Corporation.*

Hereby enters this disclaimer to claims 1 and 10 of said patent.

Certificates of Correction for the Week of June 10, 1975

P.P. 3,690	3,835,772	3,857,621	3,868,920
Re. 28,245	3,836,478	3,857,684	3,869,305
3,523,779	3,836,550	3,858,412	3,869,389
3,706,773	3,836,653	3,859,227	3,869,834
3,730,887	3,837,910	3,859,636	3,869,953
3,750,616	3,838,177	3,860,071	3,870,257
3,758,463	3,838,919	3,860,457	3,870,546
3,763,977	3,839,431	3,860,706	3,870,613
3,784,115	3,839,685	3,861,094	3,870,655
3,785,010	3,840,473	3,861,341	3,870,826
3,789,000	3,840,524	3,861,511	3,870,934
3,794,407	3,842,007	3,863,439	3,871,504
3,794,558	3,844,297	3,863,655	3,872,347
3,796,648	3,844,915	3,863,922	3,872,898
3,799,650	3,845,412	3,864,126	3,872,933
3,799,839	3,845,916	3,864,366	3,873,184
3,803,178	3,847,803	3,864,477	3,873,192
3,803,405	3,848,520	3,864,618	3,873,354
3,805,131	3,848,560	3,864,838	3,873,788
3,809,376	3,849,144	3,864,940	3,873,834
3,815,862	3,849,402	3,865,107	3,873,898
3,817,607	3,849,409	3,865,161	3,874,543
3,819,583	3,851,960	3,865,765	3,874,699
3,819,891	3,852,971	3,865,818	3,874,923
3,821,777	3,853,320	3,866,025	3,875,278
3,821,782	3,853,462	3,866,098	3,875,285
3,823,376	3,853,657	3,866,227	3,875,457
3,824,365	3,853,684	3,866,582	3,876,171
3,828,232	3,853,960	3,866,690	3,876,518
3,828,721	3,854,489	3,866,730	3,876,699
3,828,784	3,854,521	3,866,874	3,877,881
3,830,786	3,854,576	3,867,057	3,877,947
3,834,747	3,855,016	3,868,211	
3,835,248	3,856,124	3,868,582	
3,835,392	3,857,620	3,868,911	

Dedication

3,624,968.—*Alec Leibowitz*, London, England. GEM STONE POLISHING MACHINES. Patent dated Dec. 7, 1971. Dedication filed Sept. 7, 1973, by the assignee, *Spectrum Diamonds (Proprietary) Ltd.*

Hereby dedicates the entire remaining term of said patent to the Public.

Disclaimers and Dedications

3,768,535.—*Ernest L. Holden*, Phoenix, Ariz. TIRE TREAD. Patent dated Oct. 30, 1973. Disclaimer and dedication filed Mar. 27, 1975, by the assignee, *The Goodyear Tire & Rubber Company.*

Hereby disclaims and dedicates to the Public the remaining term of said patent.

3,778,579.—*Eiichi Takarada*, Rockford, Ill. ARC CONTROL. Patent dated Dec. 11, 1973. Disclaimer filed Mar. 5, 1975, by the assignee, *Amsted Industries Incorporated.*

Hereby disclaims and dedicates to the Public the remaining term of said patent.

Erratum

All references to Patent Number 3,858,414 to Lester Mishcon for Circular Knitting Machine With Pattern Wheels, appearing in the OFFICIAL GAZETTE of January 7, 1975, should be deleted since the patent should not have been granted.

Patents Available for Licensing or Sale

D. 219,763. SAFETY ASHTRAY. S. Peter Sarris, Swampscott, Mass. Correspondence to: S. Steven Karalekas, 1735 New York Ave. NW., 6th Floor, Washington, D.C., 20006.

3,690,549. AUXILIARY HEATING SYSTEM FOR AUTOMOTIVE VEHICLES. Warren Frank Hardy, 9609 Dixie Hiway, Louisville, Ky., 40272.

3,743,297. GOLF SWING PRACTICE CLUB. Edward J. Dennis, 99 Teresa St., Dale City, Calif., 94014.

3,811,513. PORTABLE PNEUMATIC POWER TOOL. Schmid & Wezel, Germany. Correspondence to: Michael S. Striker, 360 Lexington Ave., New York, N.Y., 10017.

3,848,274. INFLATABLE BED PAN. Janet Oliver 428½ Kenwood, Glendale, Calif., 91206.

3,848,774. LIQUOR DISPENSING INSTRUMENT. Lloyd J. Schimke, Box 1272, 1112 2nd St. SE., Minot, N. Dak. 58701.

3,851,398. GEAR TEST APPARATUS. Metabowerke KG Closs, Germany. Correspondence to: Michael S. Striker, 360 Lexington Ave., New York, N.Y., 10017.

3,853,768. SKIMMING DEVICE. Luigi Bagnulo, Milan, Italy. Correspondence to: Michael S. Striker, 360 Lexington Ave., New York, N.Y., 10017.

3,861,136. RECEPTACLE MOUNTED ELECTRIC CLOCK. C. W. Blenkhorn, 3199–D Via Buena Vista, Laguna Hills, Calif., 92653.

3,865,366. VARIABLE MOTION PEDAL ASSEMBLY FOR A FOOTPOWERED VEHICLE. Charles T. Stantial Station Road, Campbell Hall, N.Y., 10916.

3,866,776. BOAT LOADER OF THE SIDE MOUNTING TYPE. Michael J. Partyka, 75–B Stenton Court, Lalor Gardens, Trenton, N.J., 08610.

3,867,948. INFRA RED RADIATION MEANS WITH FAN MEANS. Adolf Kallenborn, Germany. Correspondence to: Holman & Stern (Folio 42329) 2401 15th St. NW., Washington, D.C., 20009.

The following 2 patents are offered by: Mrs. Marie Gagnier, 19 Corte Mateo, Moraga, Calif., 94556.

3,134,174. ADJUSTABLE MOUNT FOR A TELESCOPIC FIREARM SIGHT.

3,381,924. TELESCOPIC GUN SIGHT MOUNT.

The following 13 patents are offered by: Peter T. Rado, Ide & Haigney, 41 E. 42nd St., New York, N.Y., 10017.

3,029,473. VACUUM POST-CURING OF INFUSIBLE PLASTIC MATERIAL.

3,038,551. SELF-DAMPING MATERIAL AND SONAR DOME FORMED THEREFROM.

3,095,336. HIGH STRENGTH CERAMIC COMPOSITIONS AND METHODS FOR PREPARING THE SAME.

3,123,176. SONAR DOME.

3,136,380. SONAR DOME AND SELF-DAMPING COMPONENT THEREOF.

3,543,348. INJECTION MOLD APPARATUS.

3,671,159. EJECTING GIANT ARTICLES FROM INJECTION MOLD.

3,723,584. METHOD OF MAKING AN ELECTROFORMED MOLD HAVING HEAT TRANSFER CONDUITS AND FOAM POLYURETHANE FOUNDATION.

3,733,161. STRUCTURIZER MOLD.

3,734,985. GLASS FIBER REINFORCED THERMOPLASTIC CELLULAR PLASTICS.

3,744,775. MIXING OF MOLTEN PLASTIC AND GAS.

3,763,293. PROCESS OF MOLDING GIANT ARTICLES OF STRUCTURED PLASTIC.

3,796,779. MIXING OF MOLTEN PLASTIC AND GAS.

The RCA Corporation offers to grant non-exclusive licenses on reasonable terms and conditions under the following 80 patents.

Inquiries respecting licenses under these patents should be addressed to: RCA Corporation, Staff Vice President, Domestic Licensing, 30 Rockefeller Plaza, New York, N.Y., 10036.

3,869,677. MICROWAVE TRANSISTOR CARRIER FOR COMMON BASE CLASS A OPERATION.

3,869,678. MULTIPLE TRANSISTOR MICROWAVE AMPLIFIER.

3,869,705. ELECTRONIC TECHNIQUE FOR MAKING MULTICHANNEL, SPATIAL-CARRIER-ENCODED RECORDINGS.

3,869,721. RECOVERY OF NORMALLY ILLEGIBLE, MAGNETICALLY RECORDED INFORMATION.

3,870,320. PICKUP ARM CONTROL FOR VIDEO DISC PLAYER.

3,870,835. STYLUS CONTROL APPARATUS FOR A VIDEO DISC RECORD PLAYER.

3,870,954. STARTER SYSTEM FAULT DETECTOR.

3,870,958. CIRCUIT FOR APPLYING DATA SIGNALS ACROSS A MICROPHONE INPUT CIRCUIT.

3,870,966. COMPLEMENTARY FIELD EFFECT TRANSISTOR DIFFERENTIAL AMPLIFIER.

3,871,019. LINE SEQUENTIAL COLOR TELEVISION RECORDING SYSTEM.

3,871,020. CHROMINANCE SIGNAL CORRECTION.

3,871,663. RECORD CONTACT SPINDLE.

3,872,240. PICKUP APPARATUS FOR CAPACITIVE VIDEO DISC PLAYERS WITH TRANSMISSION LINE TUNED CIRCUIT.

3,872,265. VIDEO DISC TRANSMISSION LINE AND STYLUS RF RETURN SYSTEMS.

3,872,325. R-F SWITCHING CIRCUIT.

3,872,329. RADIATION SENSING CIRCUIT.

3,872,480. METHOD OF ELECTROSTATIC RECORDING ON ELECTRICALLY INSULATING FILMS BY NON-WETTING ELECTRICALLY CONDUCTIVE LIQUIDS.

3,872,497. SIGNAL TRANSLATING APPARATUS FOR COMPOSITE SIGNAL SUBJECT TO JITTER.

3,872,498. COLOR INFORMATION TRANSLATING SYSTEMS.

3,873,098. ROTARY STYLUS RESHAPER.

3,873,179. LITHIUM NIOBATE HOLOGRAM READOUT USING CONTINUOUS INCOHERENT NOISE ERASING LIGHT.

3,873,762. SPRING LOADED STYLUS ARM PIVOT.

3,873,764. SPEED CORRECTION SYSTEM FOR A VIDEO DISK PLAYBACK SYSTEM.

3,873,765. DISC PLAYBACK SYSTEM WITH SPEED CONTROL OF A BELT DRIVE.

3,873,782. CAPACITIVE PROTECTION COUPLING ELEMENT FOR STYLUS ELECTRODE DISCHARGE.

3,873,783. UNIVERSAL STYLUS AND PIVOT COUPLING.

3,873,851. CHARGE TRANSFER DECODERS.

3,873,853. COMPARATOR-KEYED OSCILLATOR.

3,873,867. SUPPORT AND FOCUS STRUCTURE FOR PHOTOMULTIPLIER.

3,873,873. DIGITAL STORAGE TUBE TARGET STRUCTURE.

3,873,879. IN-LINE ELECTRON GUN.

3,873,888. LIQUID CRYSTAL PROTECTION CIRCUIT.

3,873,906. SIGNAL CONVERSION CIRCUITS.

3,873,933. CIRCUIT WITH ADJUSTABLE GAIN CURRENT MIRROR AMPLIFIER.

3,873,990. CHROMINANCE SIGNAL CORRECTION.

Re. 28,385. METHOD OF TREATING SEMICONDUCTOR DEVICES.

Re. 28,386. METHOD OF TREATING SEMICONDUCTOR DEVICES TO IMPROVE LIFETIME.

3,875,026. METHOD FOR PRODUCING ALUMINUM HOLOGRAPHIC MASTERS.

3,875,328. APPARATUS AND METHOD FOR MEASURING THE SIGNAL TO NOISE RATIO FOR A PERIODIC SIGNAL.

3,875,441. ELECTRON DISCHARGE DEVICE INCLUDING AN ELECTRON EMISSIVE ELECTRODE HAVING AN UNDULATING CROSS-SECTIONAL CONTOUR.

3,875,450. CATHODE-RAY TUBE WITH RADIATION-EMITTING INDEX STRIP-LIKE AREAS.

3,875,535. ENHANCED EFFICIENCY DIODE CIRCUIT.

3,875,652. METHOD OF BONDING METALS TOGETHER.

3,876,472. METHOD OF ACHIEVING SEMICONDUCTOR SUBSTRATES HAVING SIMILAR SURFACE RESISTIVITY.

3,876,952. SIGNAL PROCESSING CIRCUITS FOR CHARGE-TRANSFER IMAGE-SENSING ARRAYS.

3,876,955. BIASING CIRCUIT FOR DIFFERENTIAL AMPLIFIER.

3,877,791. DEFORMABLE MIRROR LIGHT VALVE AND METHOD OF MAKING THE SAME.

3,877,810. METHOD FOR MAKING A PHOTOMASK.

3,877,883. METHOD OF GROWING SINGLE CRYSTALS OF COMPOUNDS.

3,877,981. METHOD OF ELECTROLESS PLATING.

3,878,007. METHOD OF DEPOSITING A PATTERN OF METAL PLATED AREAS ON AN INSULATING SUBSTRATE.

3,878,061. MASTER MATRIX FOR MAKING MULTIPLE COPIES.

3,878,326. VOLTAGE SUPPLY SYSTEM.

3,878,335. DIGITAL SYNCHRONIZATION SYSTEM.

3,878,336. DIGITAL SYNCHRONIZING SYSTEM.

3,878,427. APERTURED-MASK CATHODE-RAY TUBE HAVING HALF-TONE ARRAY OF HEAT-ABSORBING AREAS ON TARGET SURFACE.

3,878,428. CATHODE RAY TUBE HAVING SHADOW MASK AND SCREEN WITH TAILORED HEAT TRANSFER PROPERTIES.

3,878,470. FM DEMODULATOR.

3,878,471. STABILIZATION OF QUIESCENT COLLECTOR POTENTIAL OF CURRENT-MODE BIASED TRANSISTORS.

3,878,486. HIGH FREQUENCY DEVICE ASSEMBLY.

3,878,541. LIQUID LEVEL LIMIT INDICATOR.

3,878,556. MODULARIZED LASER DIODE ASSEMBLY.

3,879,183. CORONA DISCHARGE METHOD OF DEPLETING MOBILE IONS FROM A GLASS REGION.

3,879,582. DATA LOOP COMMUNICATION SYSTEM.

3,879,633. TELEVISION DEGAUSSING SYSTEM WITH SADDLE-TYPE COILS ADJACENT CRT CONE.

3,879,640. PROTECTIVE DIODE NETWORK FOR MOS DEVICES.

3,879,650. DC TO POLYPHASE INVERTER UTILIZING A PLURALITY OF SWITCHING DEVICE AND A TRANSFORMER HAVING A PLURALITY OF PRIMARY AND FEEDBACK WINDINGS CONNECTED IN CIRCUIT WITH THE SWITCHING DEVICE.

3,879,663. DELTA MODULATOR UTILIZING A DUTY CYCLE CIRCUIT.

3,879,683. SAWTOOTH WAVEFORM GENERATOR.

3,879,690. DISTRIBUTED TRANSMISSION LINE FILTER.

3,879,710. DATA PROCESSOR FOR A LOOP DATA COMMUNICATIONS SYSTEM.

3,879,720. ENERGY PEAK/TIME AVERAGING SEISMIC INTRUSION DETECTOR.

3,879,730. RANGE TRACKING CIRCUIT.

3,879,758. TAPE CARTRIDGE CHANGER WITH SELECTIVE CARTRIDGE AND TRACK PROGRAMMING CONTROLS.

3,880,676. METHOD OF MAKING A SEMICONDUCTOR DEVICE.

3,880,725. PREDETERMINED THICKNESS PROFILES THROUGH ELECTROPLATING.

3,881,134. RASTER CENTERING CIRCUIT.

3,881,135. BOOST REGULATOR WITH HIGH VOLTAGE PROTECTION.

3,881,181. SEMICONDUCTOR TEMPERATURE SENSOR.

3,881,183. READ/WRITE CIRCUITS FOR RELIABLE DIGITAL RECORDING.

General Electric Company is prepared to grant non-exclusive licenses under the following 82 patents on reasonable terms to domestic manufacturers.

Applications for licenses under the following 2 patents may be addressed to: Patent Counsel, Telecom, Products Dept., General Electric Co., Lynchburg, Va., 24502.

3,867,681. BATTERY CHARGING CIRCUIT.

3,873,776. ALARM ARRANGEMENT FOR A TIME DIVISION MULTIPLEX, PULSE-CODE MODULATION CARRIER SYSTEM.

Applications for license under the following 23 patents may be addressed to: Patent Counsel General Electric Co., Building 43, Room 529, 100 Woodlawn Ave., Pittsfield, Mass., 01201.

D. 226,326. LUMINAIRE.

3,058,951. COMPOSITION COMPRISING AN EPOXY RESIN, A POLYVINYL ACETAL RESIN, AND A POLYACRYLATE RESIN, AND AN ARTICLE COATED THEREWITH.

3,083,119. THERMALLY STABLE LAYER INSULATION.

3,113,172. PRESSURE RELIEF DEVICE.

3,150,243. THREE POSITION, SNAP ACTION ROTARY SWITCH.

3,365,540. CABLE HOLDER.

3,377,480. LUMINAIRE.

3,425,049. VOLTAGE TEST DEVICE.

3,430,394. FRAME DEVICE WITH A STRIP FOR REMOVING BROKEN GLASS FRAGMENTS AND SEALING MATERIAL.

3,430,996. ADJUSTING BOLT.

3,431,003. LATCH DEVICE.

3,435,290. VOLTAGE SURGE PROTECTOR FOR SUBMERGED DEEP WELL PUMP MOTORS.

3,440,519. CONSTANT CURRENT REGULATOR WITH MOVING COIL TRANSFORMER.

3,440,520. CONSTANT CURRENT REGULATOR WITH MOVING COIL TRANSFORMER.

3,513,425. MODULAR ELECTRICAL CONDUCTOR TERMINATION SYSTEM.

3,598,178. HEAT PIPE.

3,600,742. CONCEALED DOUBLE-PIVOT HINGE FOR HINGED ENCLOSURE.

3,643,088. LUMINAIRE SUPPORT.

3,646,503. HANDLING MEANS FOR A CABLE TERMINATION HOUSING HAVING STRESS ISOLATING MEANS BETWEEN THE HOUSING AND THE HANDLING MEANS.

3,678,432. VENTED FUSE MODULE FOR UNDERGROUND POWER CABLE SYSTEM.

3,727,104. PROTECTIVE CIRCUIT FOR LIGHTING SYSTEM.

3,801,899. MEANS FOR DETECTING THE INCEPTION OF CORONA DISCHARGES WITHIN INDUCTION APPARATUS.

3,862,092. POLYAMIDE-IMIDE COMPOSITIONS.

Applications for license under the following 26 patents may be addressed to: Group Patent Counsel, Major Appliance Business Group, General Electric Company, Appliance Park, Louisville, Ky., 40225.

D. 225,780. PORTABLE MICROWAVE OVEN OR SIMILAR ARTICLE.

3,422,994. ICE DISPENSER HAVING STAGES WITH DIFFERENT FEED RATES.

3,684,853. INDUCTION SURFACE HEATING UNIT SYSTEM.

3,781,522. THERMOCHROMIC SURFACE HEATING APPARATUS.

3,781,523. THERMOCHROMIC SURFACE HEATING APPARATUS.

3,814,888. SOLID STATE INDUCTION COOKING APPLIANCE.

3,816,704. SURFACE HEATING APPARATUS.

3,820,005. INVERTER WITH CONSTANT DUTY CYCLE CONTROL.

3,821,630. COMMUTATION FAILURE DETECTION AND CONTROL FOR SCR INVERTERS.

3,832,621. RELIABLE STATIC POWER CONVERTER WITH CONTROL LOGIC.

3,842,542. REMOVABLE OVEN DOOR HINGE SYSTEM.

3,843,862. MICROWAVE OVEN HAVING TM AND TE MODES.

3,843,863. IMPEDANCE VARYING DEVICE FOR MICROWAVE OVEN.

3,845,267. MICROWAVE OVEN WITH WAVE GUIDE FEED.

3,845,273. COMPOSITE METAL PLATE SURFACE HEATING UNIT.

3,847,135. HINGED ADAPTER DUCT FOR OVEN VENT.

3,855,440. MICROWAVE OVEN HAVING PREFERRED MODES.

3,856,058. LIQUID DISPENSER HAVING IMPROVED OVERFILL PROTECTOR.

3,858,270. REFRIGERATOR CABINET HAVING ADJUSTABLE WHEEL OR ROLLER.

3,859,901. RECIRCULATING VENTILATING HOOD.

3,862,609. INCINERATOR ASH REMOVAL APPARATUS.

3,862,720. WASTE DISPOSER INSTALLATION.

3,862,786. WASHER INSTALLATION.

3,863,391. REVERSIBLY MOUNTED CABINET DOOR.

3,863,619. COLLAPSIBLE HEAT SHIELD FOR WINDOW OF OVEN DOOR.

3,866,018. MOLDED PLASTIC COOKTOP WITH HEATED GLASS-CERAMIC PLATE INSERT.

Applications for license under the following 31 patents may be addressed to: Patent Counsel, General Electric Company, 1501 Roanoke Blvd., Salem, Va., 24153.

2,888,129. CONTROL SYSTEM FOR CONVEYING APPARATUS.

2,964,691. CONSTANT CURRENT MOTOR CONTROL.

2,982,907. CONTROL SYSTEM.

3,024,401. MOTOR CONTROL CIRCUIT.

3,024,405. HALF-WAVE MOTOR CONTROL CIRCUIT.

3,026,463. SPEED CONTROL SYSTEM FOR D.C. MOTORS.

3,064,174. MOTOR SPEED CONTROL CIRCUITS.

3,164,767. SYNCHRONIZATION AND LOCKOUT CONTROL SYSTEM FOR CONTROLLED RECTIFIERS.

3,187,243. MOTOR ACCELERATION CONTROL FOR A TENSIONING SYSTEM.

3,192,482. CIRCUIT FOR GENERATING AN INVERSE SIGNAL UTILIZING A MULTIPLIER CIRCUIT.

3,227,936. POLYPHASE MOTOR CONTROL ARRANGEMENT.

3,242,410. CIRCUIT FOR CONTROLLING ENERGIZATION OF A DIRECT CURRENT LOAD.

3,308,397. SATURABLE CURRENT TRANSFORMER-TRANSISTOR INVERTER CIRCUIT.

3,319,147. VARIABLE FREQUENCY, VARIABLE WAVE FORM INVERTER.

3,320,519. SILICON CONTROL SWITCH-SATURABLE TRANSFORMER CURRENT LIMIT PROTECTIVE CIRCUIT.

3,364,838. CABINET FOR MOUNTING, ENCLOSING AND COOLING ELECTRICAL APPARATUS.

3,414,797. POWER CONVERTER EMPLOYING INTEGRATED MAGNETICS.

3,418,550. BRUSHLESS ADJUSTABLE SPEED DRIVE.

3,426,262. SYSTEM FOR CONTROLLING INTERMITTENT AND BIDIRECTIONAL OPERATION OF MOTORS.

3,458,791. ADJUSTABLE SPEED DRIVE SYSTEM WITH FRICTION COMPENSATION.

3,465,228. PULSE WIDTH CONTROL FOR ADJUSTABLE SPEED DRIVE SYSTEM.

3,474,320. VARIABLE FREQUENCY AND VOLTAGE ELECTRIC POWER INVERTER UTILIZING AN AUXILIARY SOURCE OF FIXED-MAGNITUDE COMMUTATING VOLTAGE.

3,515,971. MOTOR CONTROL SYSTEM WITH FEEDBACK AND VARIABLE GAIN AMPLIFIER RESPONSIVE TO CURRENT.

3,536,984. POLYPHASE INVERTER WITH SELF-PROTECTION MEANS.

3,541,426. CROSSFIRE PROTECTION TECHNIQUE.

3,568,021. LOW COST VARIABLE INPUT VOLTAGE INVERTER WITH RELIABLE COMMUTATION.

3,596,158. STABILIZING PHASE CONTROLLED AC INDUCTION MOTORS.

3,614,571. LINEARIZATION OF A DIGITAL PHASE CONTROL POWER AMPLIFIER FOR DYNAMO ELECTRIC MACHINE.

3,671,836. POWER CONVERSION CONTROL SYSTEM.

3,678,358. BRUSHLESS DC ADJUSTABLE SPEED DRIVE WITH STATIC REGENERATIVE DC MOTOR CONTROL.

3,775,651. POWER SYSTEM OVERCURRENT PROTECTION MEANS UTILIZING VOLTAGE ADJUSTMENT.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF MAY 24, 1975

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	6-26-74
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	4-22-74
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	6-24-74
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	9-3-74
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	8-1-74
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	11-6-74
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	2-28-74
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	7-2-74
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	10-29-74
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	5-8-74
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	2-4-74
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—G. M. FORLENZA, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	8-15-74
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—D. J. STOCKING, Director. Manufacturing Processes, Assembling, Combined Machines; Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	9-3-74
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—R. E. PULFREY, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	7-30-74
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	8-9-74
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	10-29-74

Expiration of patents: The patents within the range of numbers indicated below expire during June 1975, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,836,826, to 2,840,820 inclusive
Plant Patents..... Numbers 1,714, to 1,721 inclusive

REISSUES

JUNE 10, 1975

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

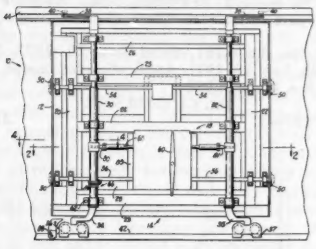
28,443
OVER-TRAVEL AND RETURN MECHANISM FOR DOOR

Irving D. Ross, Jr., Barrington, and Thorvald Madland, Arlington Heights, Ill., assignors to The Youngstown Steel Door Co., Cleveland, Ohio

Original No. 3,747,270, dated July 24, 1973, Ser. No. 113,143, Feb. 8, 1971. Application for reissue June 26, 1974, Ser. No. 483,111

Int. Cl. E05d *15/10*

U.S. Cl. 49—220 4 Claims



1. A plug-type rail car door assembly comprising:

a door member;

at least [a pair of] *first and second* shaft and crank assemblies supporting said door on *respective first and second* roller means for permitting said door assembly to be moved in a first direction longitudinally toward a door opening and in a second direction longitudinally away from a door opening,

said assemblies having cranks mounted to be rotated through an arc defined by a first door closed position and a second door open position wherein said cranks are substantially normal to said door and *at least said first shaft and crank assembly including one of said cranks mounted to be rotated to* a third position beyond said second position from said first position,

actuating means for rotating said shaft and crank assemblies to cause said door member to move out of and into said door opening as said cranks are moved respectively from said first position to said second position and from said second position to said first position,

said actuating means including means maintaining the cranks of said assemblies in said second position during longitudinal movement of said door on said roller means,

stop means for engaging *at least said first of* said roller means to stop *said first of* said roller means at a predetermined point relative to said opening during longitudinal movement of said door in said first direction;

cushion means adjacent said opening and inwardly of the edges of the door when said cranks are in said second position;

over-travel means including spring means connected between said door and *at least said first of said* crank [assembly] *assemblies*,

whereby upon engagement of *said first of* said roller means with said stop means the edge of the door in the direction of travel pivots inwardly, relative to its position during longitudinal movement, toward said cushion means to absorb the kinetic energy in the door as [the cranks move] *said first crank moves* from [their] *its* second position to [their] *its* third position and by action of the spring means back to the second position.

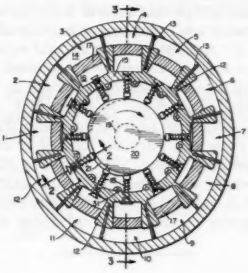
28,444
ROTARY APPARATUS

Edward T. Saylor, Jr., 789 E. Glen Ave., Ridgewood, N.J. 07450

Original No. 3,595,018, dated July 27, 1971, Ser. No. 886,421, Dec. 18, 1969, which is a continuation-in-part of application Ser. No. 687,947, Nov. 9, 1967, now Patent No. 3,485,174. Application for reissue May 11, 1973, Ser. No. 359,237

Int. Cl. F01b *13/06*; F02b *57/08*; F02g *3/00*

U.S. Cl. 60—39.61 11 Claims



1. A rotary [fluid motor] *apparatus* comprising:

(a) a casing having an inner and outer wall, said inner wall being of an approximately [circular] *elliptical* shape defined by points at non-uniform radial distances from a center [point], said points being located at angular displacements defined with respect to said center [point] and measured from a reference point in a direction of rotation, said inner wall being at [minimum] *maximum* radial distances from said center [point] at [minimum] points located at angular displacements of about 90° and about 270° from said reference point, said inner wall *being* at [maximum] *minimum* radial distances from said center [point being at maximum points located] at angular displacements of about 0° and 180° from said reference point,

(b) a circular vaned wheel arranged within said casing for rotation about said center [point] in said direction of rotation and spaced from said inner wall, said wheel including a central hub and fixed vanes extending radially from said hub [at substantially uniform distances from said point], said fixed vanes forming channels adapted to accommodate a gas and a liquid in the form of a liquid cell adjacent to the inner wall and a gas cell adjacent to the central hub, a piston located in each channel slidably mounted therein to partition each channel into said gas and liquid cells, said fixed vanes and channels located at

angular displacements defined with respect to said center [point] and measured from said reference point in said direction of rotation;

(c) movable vanes incorporated in said fixed vanes and extendable and retractable therefrom, means for urging said movable vanes into continuous contact with said inner wall to seal said channels,

[d. valve means for introducing a motive gas through gas port means within said central hub into said gas cells of said vaned wheel located at angular displacements of about 0° to about 90° from said reference point, said valve means further being adapted to close gas port means thereby sealing gas cells at angular displacements of about 90° to about 270° and said gas port means further adapted to allow the exhaust of said gas cells located at about angular displacements of about 270° to about 360°, end placed closing said casing and means for journaling said vaned wheel and central hub for rotation within said casing.]

(d) end plates closing said casing and means for journalling said vaned wheel and central hub for rotation within said end plates,

(e) means in conjunction with said casing and central hub for introducing a [motive] gas [through] *into* said central hub for passage into said cells located *at angular displacements of about 0° to 90°* [into each of said gas cells.]

(f) valve means for introducing said gas through gas port means within said central hub into said gas cells of said vaned wheel located at angular displacements of about 0° to about 90° from said reference point, said valve means further being adapted to close gas port means thereby sealing gas cells at angular displacements of about 90° to about 270° and said gas port means further adapted to allow the exhaust of said gas from said gas cells located at about angular displacement of about 270° to about 360°,

(g) and means in conjunction with said casing and central hub for exhausting said gas cells at angular displacements of about 270° to about 360°.

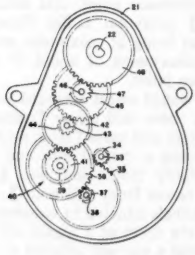
28,445
ROTARY HUMIDIFIER DRIVE

Walter R. Stiles, Milford, Mich., assignor to Skuttle Mfg. Co., Milford, Mich.

Original No. 3,408,880, dated Nov. 5, 1968, Ser. No. 638,235, May 15, 1967, which is a continuation-in-part of abandoned application Ser. No. 578,364, Sept. 9, 1966. Application for reissue Apr. 18, 1974, Ser. No. 462,028

Int. Cl. F16h *57/00;* **F24f** *3/14*

U.S. Cl. 74—405 **9 Claims**



1. In a humidifier assembly of the type wherein a water pick-up rotor [having] ***consisting essentially of skeleton frame means and an annular flexible sleeve or porous synthetic plastic material mounted on said frame means with its*** **lower portion extending into a body of water is driven from a motor through a drive line containing a train of speed reduction gearing** ***and said rotor is rotatably supported on coaxial shaft means projecting from opposite ends of said rotor*** **the improvement which comprises a normally engaged slip clutch unit in said drive line** ***connected between the output side of said train of gearing and one of said shaft means*** **adapted to slip and interrupt power transmission therethrough when subjected to torque in either direction of rotation in excess of a predetermined amount and to automatically resume power transmission when such excess torque condition does not prevail.**

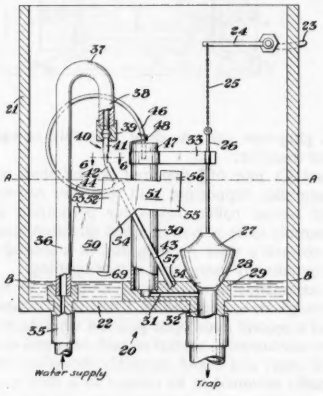
28,446
ECCENTRIC ACTING FLOAT-CONTROLLED PINCH-VALVE VESSEL FILLING ASSEMBLY

Wallace H. Buswell, Beaverton, Mich., assignor of fractional part interest to Clare C. Anderson, Midland, Mich.

Original No. 3,670,751, dated June 20, 1972, Ser. No. 117,301, Feb. 22, 1971. Application for reissue June 13, 1974, Ser. No. 478,950

Int. Cl. G05d *9/02*

U.S. Cl. 137—1 **31 Claims**



1. In combination with a vessel to be controllably filled with a liquid to a pre-determined filled level, said vessel having defining walls and controllable liquid emptying means, the float-controlled pinch-valve vessel filling device mounted therein, which comprises:

a liquid supply conduit positioned to deliver liquid inside the vessel, said supply conduit having a terminal portion positioned above the pre-determined filled level and extending approximately vertically downward towards said filled level;

delivery tube means having a first end portion coupled to the terminal end of said supply conduit and communicating therewith, and a second dependent portion terminating in a free distal end that is directed downwardly when the vessel is empty, and the delivery tube means having a third portion co-joining the first and second portions and being flexible and adapted to prevent liquid flow therethrough by its internal cross-section becoming substantially zero when flexed to form an included angle less than about 90° between the first and second portions;

buoyant float means associated with and attached to said delivery tube means between the point of flexing, in

the third portion, and the mid-length of the second portion of the delivery tube means;

and stop means restricting the pivotal movement of the buoyant float means and associated delivery tube means about the point of flexing when the delivery tube means depends downwardly when the vessel is in a substantially empty condition prior to filling and the associated float and delivery tube means are in filling position;

said buoyant float means being buoyant in, substantially impervious to, and substantially unattacked by, said liquid;

said buoyant float means being shaped with first and second slightly elongated body portions each having a longitudinal axis and each having an end co-joined at an angle of about 90° between said axes with the end of the second body portion overlapping the end of the first body portion by about one-fourth to one-third the width of said first body portion, said second body portion having a side extension adjacent its free end, said side extension projecting from the side opposite the side to which the first body portion is joined, and said second body portion having a buoyancy at least about as great as said first body portion;

said delivery tube means being substantially coplanar therewith and attached to said buoyant float means and extending along a line between the body portions at an angle of between at least 15° to the longitudinal axis of the first body portion and at least 30° to the longitudinal axis of the second body portion and at a point along the delivery tube means whereby upon such tube means depending downwardly, the longitudinal axis of the second body portion is at approximately the height of the predetermined filled level;

and said stop means being positioned relative to the combination of factors (1) the position of the vertically downward portion of the supply conduit, (2) the dimensions of the first body portion of the buoyant float means, and (3) the angle between the second portion of the delivery tube means to the buoyant float means, whereby in the assembly, prior to filling the vessel when the second portion of the delivery tube means depends downwardly and the buoyant float means is pushed substantially horizontally against the stop means by initial flow of filling liquid and by buoyancy of the first body portion, the longitudinal axis of said first body portion extends, at the bottom end thereof, away from a line drawn vertically downward from said downwardly extending portion of the supply conduit and toward said stop means, the stop means being spaced a distance equal to from about 85 to 95 percent of the thickness of the first body portion from the line vertically drawn, while the second portion of the delivery tube means diverges away from said stop means and depends at an angle of from about 10° to about 55° with respect to said line drawn vertically.

28,447
SERVICE REGULATOR WITH HIGH-LOW PRESSURE CUTOFF DEVICE

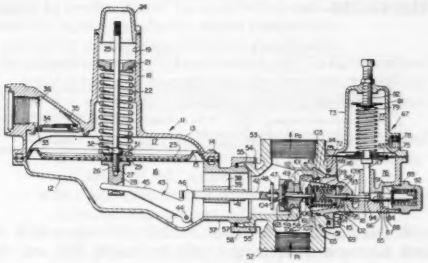
Joseph A. Bonner, Pittsburgh, and Howard J. Evans, New Kensington, Pa.; Eugenia Wilson Evans, independent executrix of said Howard J. Evans, deceased, assignors to Rockwell International Corporation, Pittsburgh, Pa.

Original No. 3,623,506, dated Nov. 30, 1971, Ser. No. 859,712, Sept. 22, 1969. Application for reissue Oct. 1, 1973, Ser. No. 402,091

Int. Cl. F16k *17/22*

U.S. Cl. 137—613 **15 Claims**

1. A gas pressure regulator comprising a main valve controlling flow of gas therethrough and means responsive to downstream gas pressure for actuating said main valve to regulate the downstream gas pressure, a cutoff valve adapted for controlling flow of gas through said regulator, and means in said regulator *including a positional control connection between said valves and* responsive respectively to downstream gas pressures below and



above predetermined limits for actuating said cutoff valve to arrest flow of gas through said regulator, *said cutoff valve being spring biased toward cutoff position and said control connection comprising a direct motion transmitting means extending between said main valve and said cutoff valve.*

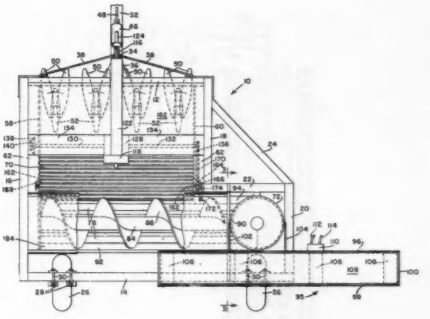
28,448
ROOT CROP HARVESTING IMPLEMENT

Richard David Zaun, and Richard Wayne Hook, Des Moines, Iowa, assignors to Deere & Company, Moline, Ill.

Original No. 3,791,451, dated Feb. 12, 1974, Ser. No. 209,124, Dec. 17, 1971. Application for reissue July 26, 1974, Ser. No. 492,069

Int. Cl. A01d *17/00*

U.S. Cl. 171—58 **12 Claims**



1. A root crop harvester comprising: a main frame; root digging means secured across the forward end of the frame; elevator means including a substantially upright auger conveyor mounted on the frame, *transversely offset of the fore-and-aft center line,* for moving roots from the lower end thereof upwardly to a deposit area; and conveyor means supported on the main frame to receive roots from the digging means and moving the same upwardly and laterally from the root digging means to the lower end of the upright auger conveyor.

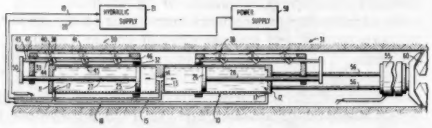
28,449
ANCHORING AND PRESSURING APPARATUS FOR A DRILL

Tibor O. Edmond, Ponca City, Okla., by Continental Oil Company, Ponca City, Okla., assignee

Original No. 3,827,512, dated Aug. 6, 1974, Ser. No. 325,773, Jan. 22, 1973. Application for reissue Sept. 3, 1974, Ser. No. 502,581.

Int. Cl. E21b *3/12;* **E21c** *19/00*

U.S. Cl. 175—94 **13 Claims**



8. An apparatus for incrementally forcing a drill bit into the earth comprising a cylinder having first and second ends, first and second pistons in said cylinder with piston rods extending axially from each of said pistons through said first and second ends, respectively, an anchoring assembly for each piston including an anchor means, a sliding mount retaining said anchor means supported between said cylinder and said piston rod and means coupled to said piston rod and to said anchor means, a first hydraulic port mounted between said pistons, and a port mounted at each end of said cylinder.

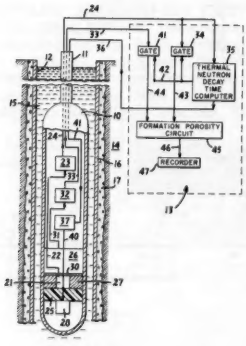
28,450
TWO DETECTOR PULSE NEUTRON LOGGING POROSITY TECHNIQUE

Robert J. Schwartz, Houston, Tex., assignor to Schlumberger Technology Corp., New York, N.Y.

Original No. 3,621,255, dated Nov. 16, 1971, Ser. No. 863,771, Oct. 2, 1969, which is a continuation of application Ser. No. 705,154, Feb. 13, 1968. Application for reissue Sept. 13, 1973, Ser. No. 396,818

Int. Cl. G01t *3/00*

U.S. Cl. 250—264 **16 Claims**



1. A system for [computing] *investigating* the porosity of an earth formation traversed by a borehole, comprising:

a source of neutrons for irradiating the formation with pulses of neutrons,

[a] means for producing [a signal] *signal* that [corresponds] *corresponds to at least* thermal neutron *population* [absorption time] within the borehole environment *between neutron pulses,*

circuit means responsive to said [thermal] neutron [absorption signal means] *population signals* for producing a gating signal that is automatically related primarily to the thermal neutron [absorption time] *population variations* characterizing the earth formation, as the earth formation strata change along the length of the borehole, as distinguished from the thermal neutron [absorption time] *population variations* that [characterizes] *characterize* the borehole,

gate means responsive to said gating signal *from said* circuit means for passing [a portion] *portions* of said [thermal] neutron [absorption signal] *population signals* that [is] *correspond to the neutron population characterizing the earth formation, said gated signal portions being* related to the porosity of the earth formation as distinguished from a characteristic of the borehole, and

further circuit means responsive to said gated signal [portion] *portions* for producing another signal that corresponds to the earth formation porosity [measured only during said thermal neutron absorption time that characterizes the earth formation in response to said gating signal means].

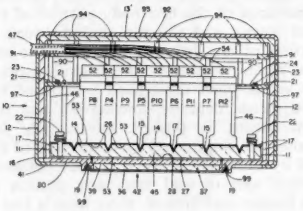
28,451
RADIATION DETECTING APPARATUS

David J. Spleha, Franklin Park, and Marvin J. Kreuser, Schaumburg, Ill., assignors to G. D. Searle & Co., Skokie, Ill.

Original No. 3,723,735, dated Mar. 27, 1973, Ser. No. 111,409, Feb. 1, 1971. Application for reissue Dec. 13, 1973, Ser. No. 424,198

Int. Cl. G01t *1/20*

U.S. Cl. 250—366 **14 Claims**



11. A radiation detecting apparatus for locating a radiation source in two-dimensional coordinates and for indicating the intensity of radiation produced by said radiation source comprising:

a. a planar scintillating crystal assembly having opposite faces,

b. a plurality of photomultiplier tubes having light sensitive faces lying in a plane parallel to said scintillating crystal assembly and spaced therefrom,

c. a light guide interposed between said scintillating crystal assembly and said photomultiplier tubes comprising an upstream surface having a highly transparent area in intimate contact with one of said faces of said scintillating crystal assembly, a downstream surface having highly transparent areas in intimate contact with said light sensitive faces of said photomultiplier tubes, a boundary surface joining said downstream and upstream surfaces and spanning the distance between said scintillating crystal assembly and said light sensitive faces of said photomultiplier tubes, and a coating of greater light absorbency than white paint on said light guide surrounding the aforesaid areas of intimate contact with said scintillating

crystal assembly and said light sensitive faces of said photomultiplier tubes,

d. amplifying and computing circuitry means coupled to each of said photomultiplier tubes for computing the two-dimensional coordinates of a scintillation produced in said scintillating crystal assembly according to the quanta of radiation produced by said scintillation and sensed by each of said photomultiplier tubes, and

e. location registration means coupled to said amplifying and computing circuitry means for recording the coordinates of a scintillation.

28,452

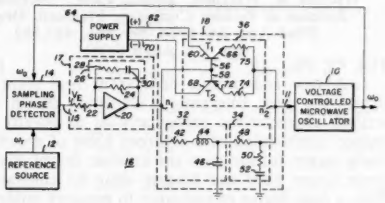
DUAL BANDWIDTH PHASE LOCK LOOP

Drew R. Lance, Saratoga, Calif., assignor to California Microwave Incorporated, Sunnyvale, Calif.

Original No. 3,805,183, dated Apr. 16, 1974, Ser. No. 304,136, Nov. 6, 1972. Application for reissue Sept. 3, 1974, Ser. No. 502,747

Int. Cl. H03b *3/06*

U.S. Cl. 331—17 **8 Claims**



2. In a phase lock loop [as recited in claim **1** wherein said control network includes] *including a microwave oscillator responsive to a control signal and operative to develop a microwave output signal, a reference source for developing a fixed frequency reference signal, a phase detector responsive to said output signal and said reference signal and operative to develop an error signal commensurate with a difference in phase between said reference signal and said output signal, and signal translating means responsive to said error signal and operative to develop a control signal for controlling said oscillator, an improved signal translating means comprising:*

means for amplifying said error signal; and

an adaptive control network responsive to the amplified error signal and operative to develop said control signal for controlling the phase of said oscillator; said network including

a first terminal for receiving said error signal and a second terminal connected to the control signal input of said oscillator,

a low-pass filter circuit connected between said first terminal and said second terminal,

an out-of-band filter circuit coupled in series with said low pass filter circuit between said first and second terminals, *and*

voltage-follower means including a first transistor having a base electrode connected to said first terminal, a collector electrode for connection to a first source of potential, and an emitter electrode connected to said second terminal, and a second transistor having a base electrode connected to said first terminal, a collector electrode for connection to a second source of potential and an emitter electrode connected to said second terminal, said control network having a first bandwidth characteristic when said amplified error signal is less than a predetermined threshold value and having a second bandwidth characteristic when said amplified error signal is greater than said threshold value.

PLANT PATENTS

GRANTED JUNE 10, 1975

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

3,727
ROSE PLANT
William A. Warriner, Tustin, Calif., assignor to Jackson & Perkins Company, Medford, Oreg.
Filed Mar. 21, 1974, Ser. No. 453,302
Int. Cl. A01h *5/00*
U.S. Cl. Plt.—20 1 Claim

1. A new and distinct cultivar of rose plant of the hybrid tea class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of its vigorous, upright habit of growth, suitability as a greenhouse cut flower, its dark green, mildew resistant foliage, its lack of fragrance, its bud and flower color near Wilson's Current Red.

3,728
ROSE PLANT
William A. Warriner, Tustin, Calif., assignor to Jackson & Perkins Company, Medford, Oreg.
Filed Mar. 15, 1974, Ser. No. 451,499
Int. Cl. A01h *5/00*
U.S. Cl. Plt.—26 1 Claim

1. A new and distinct cultivar of rose plant of the floribunda class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of vigorous habit of growth, high production of cut flowers throughout the year, strong stems suitable for cut flowers, all characteristics which are similar to the cultivar Bridal Pink. The bud and flower color are distinctive and novel in this new cultivar, being near Geranium Lake as the sepals unfold and Camellia Rose in the opening and full open flower.

3,729
William A. Warriner, Tustin, Calif., assignor to Jackson & Perkins Company, Medford, Oreg.
Filed Apr. 24, 1974, Ser. No. 463,502
Int. Cl. A01h *5/00*
U.S. Cl. Plt.—18 1 Claim

1. A new and distinct cultivar of rose plant of the hybrid tea class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of a vigorous habit of growth, relatively larger foliage than the cultivar Bridal Pink, relatively larger buds and blooms than the cultivar Bridal Pink, a high degree of resistance to powdery mildew, long stems suitable for use as cut flowers, a bud and flower color of Camellia Rose opening to French Rose.

PATENTS

GRANTED JUNE 10, 1975

ERRATA

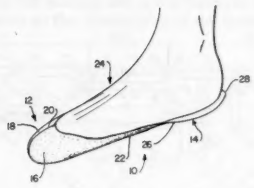
For CLASS	See PATENT NO.
030–358	3,888,068
072–364	3,888,119
093–001c	3,888,160
106–015 AF	3,888,176
426–126	3,888,224
139–123	3,888,272
353–029	3,888,462
242–056	3,888,480
252–513	3,888,575
352–092	3,888,780
200–016	3,888,807
426–262	3,888,859
427–243	3,889,024
200–268	3,899,098

PATENTS

GRANTED JUNE 10, 1975

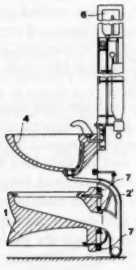
GENERAL AND MECHANICAL

3,887,946
FOOT COVERING
Sondra Laskin, and Hyman Laskin, both of 1003 Gabel St., Silver Spring, Md.
Filed Oct. 3, 1973, Ser. No. 402,982
Int. Cl. A43b *17/00*
U.S. Cl. 2—239 **7 Claims**



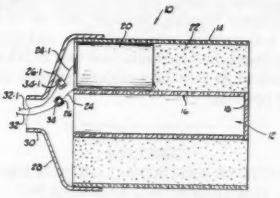
5. A foot covering comprising a single sheet of material symmetrical about a vertical axis and having a toe, arch and heel portion, said toe being closed by means joining symmetrical segments of the periphery of said sheet from a point at which said periphery crosses said vertical axis in said toe portion to corresponding points which are the lower end points of two peripheral segments of said toe section which are parallel to said vertical axis before joining, said arch and heel portion being open and said heel portion terminating in a straight line substantially perpendicular to said vertical axis, and said corresponding points at which said joining means terminates being such that upon insertion of the toes of a foot into said closed toe portion, the peripheral edges of said arch portion curve up from said vertical axis to form lateral walls around the arch of said foot.

3,887,947
PIVOTABLE MODULAR HYGIENIC-SANITARY SYSTEM
Alessandro Tosca, Via Bosco 53 Fontana Pradosa, Piacenza, Italy
Filed Nov. 5, 1973, Ser. No. 413,060
Claims priority, application Italy, Nov. 8, 1972, 31421/72
Int. Cl. A47k *4/00*
U.S. Cl. 4—2 **4 Claims**



1. A modular hygienicsanitary system for use in a bathroom facility, comprising a support structure having an upright wall; a sanitary fixture having a toilet bowl recess in a surface located at one side of a first horizontal axis and a bidet bowl recess in a surface located at the opposite side of said first horizontal axis; means mounting said fixture on said wall for turning movement about said first horizontal axis so that said recesses are selectively movable to an upwardly facing position by turning said fixture about said first horizontal axis; a wash basin; means mounting said wash basin on said wall so that said wash basin is pivotable about a vertical axis in a horizontal plane to and from a position in which it is located above said fixture; a shower base; and means mounting said base on said wall laterally spaced from said fixture and said basin so that said base is pivotable about a second horizontal axis located at a level lower than said first horizontal axis between one position in which said shower base projects horizontally from said wall and is ready for use and another position in which said shower base is upright and extends substantially parallel to said wall.

3,887,948
CONDITIONING DEVICE FOR DEODORISING AND/OR ODOURISING AIR
Robin Harry Stamper, 1891 Westbourne Rd., Bryanston, South Africa
Filed Oct. 5, 1973, Ser. No. 403,879
Claims priority, application South Africa, Oct. 6, 1972, 72/7169; Oct. 6, 1972, 72/7170; Oct. 6, 1972, 72/7171
Int. Cl. A47k *3/22;* **E03d** *9/04, 13/00*
U.S. Cl. 4—213 **1 Claim**

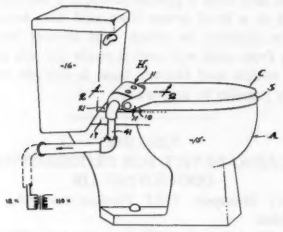


1. A disposable conditioning pack for use in a ventilating apparatus of a sanitary manufacture such as a toilet bowl or bedpan to condition air, said pack comprising an outer perforated casing, an inner perforated casing positioned wholly within the outer casing and forming an annular container surrounding a central air passage, a battery and an air-permeable substance that alters the odour of air passing therethrough positioned in the annular container formed between the two casings, leads extending from the battery out of one end of the casing to terminals positioned outside the casing for connection to an air displacement means for displacing air to be conditioned through the substance, the central air passage being open at the end from which the leads extend and closed at the other end, the amount of said air-permeable substance being such that, when the battery is exhausted, the odour-altering property of said substance is substantially exhausted as well.

3,887,949
VENTILATED SEATING FOR A WATER CLOSET
John S. Osmond, 2467 Louella Ave., Venice, Calif. 90291
Filed Aug. 3, 1973, Ser. No. 385,406
Int. Cl. A47k *13/28, 13/30;* **E03d** *9/05*
U.S. Cl. 4—217 **6 Claims**

1. Seating for adaption to a water closet comprised of a bowl for receiving and disposing of excrement and the like, the bowl having a concavely curved inner rim and a flattened hinge area extending outwardly and rearward from said rim at each side of the water closet and including, an means to immovably fix an adapter housing to said hinge area and having walls forming a chamber with a lip to engage upon the hinge area and overhang the said concavely curved rim of the bowl

forming thereby a downwardly opening inlet from the bowl into said chamber and having hinge means disposed on a transverse axis, fan means within the said chamber exhausting air therefrom and through an exhaust opening and tube extending to a remote discharge point, there being a seat, and trunnions pivoting the seat to the adapter housing on said hinge means and wherein there is a bulkhead and means for selectively locating said bulkhead.



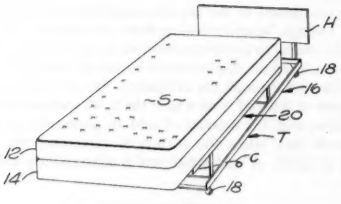
4. The seating for a water closet as set forth in claim **1**, wherein there is means for selectively locating the bulkhead over the hinge area at either side of the water closet to thereby divide the adapter housing chamber into an enlarged inlet plenum and a diminished exhaust plenum, and there is means to reversibly insert the fan means into said bulkhead to draw the air therethrough into said exhaust plenum and through said exhaust opening.

3,887,950

BED STRUCTURE AFFORDING DISPLACEMENT FOR HOUSEKEEPING AND MAKING

William P. Wachsman, 10430 Wilshire Blvd., Los Angeles, Calif. 90024

Filed Aug. 28, 1973, Ser. No. 392,395
Int. Cl. A61g *7/10*
U.S. Cl. 5—11 **5 Claims**



1. A bed structure for supporting a sleeping platform alternately in a reclining position and in an elevated convenience position, comprising:

a base support for receiving bed members;

a holding member for said sleeping platform;

a plurality of pivot link means affixed to extend between said base support and said holding member, said link means including pairs of said link means aligned on opposed sides of said holding member;

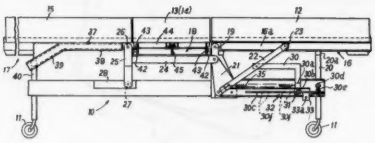
elongated telescopically-related crank members extending between each of said pairs of link means for controlling the motion of said pivot link means in similar arcuate motion patterns to move said sleeping platform horizontally and vertically between said reclining position and said convenience position.

3,887,951

INVALID BED

Michael Joseph Yates, Margate, and Kenneth James Hurst, Folkestone, both of England, assignors to Pioneer Welding Company Limited, Kent, England

Filed Jan. 28, 1974, Ser. No. 437,220
Claims priority, application United Kingdom, Jan. 26, 1973, 4226/73
Int. Cl.² A61G *7/02*
U.S. Cl. 5—90 **5 Claims**



1. A bed comprising:

a main frame;

head-end, middle and foot-end mattress supports mounted end-to-end on said main frame;

said head-end support having its end nearer the middle support pivotally mounted on said main frame for adjustment of the angle of inclination of said head-end support; a first guideway provided in said head-end support and extending lengthwise thereof;

a second guideway provided in said main frame and disposed beneath said foot-end support, said second guideway extending lengthwise of said main frame;

a guide element engaged in and movable along said second guideway;

a first lever having three pivot points arranged in the form of a triangle, said first lever being pivotally mounted on said main frame by a first of said pivot points thereof and having at a second of said pivot points thereof a guide element engaged in the first said guideway;

a second lever to which said middle support is secured and which has three pivot points arranged in the form of a triangle, which pivot points are respectively connected to a first end of said foot-end support nearer said middle support, to the third of the pivot points of said first lever at a location adjacent the said end of the head-end support nearer the middle support, and to said guide element which is engaged in said second guideway;

whereby said middle and foot-end supports and said second lever are mounted for movement lengthwise of said main frame in dependence on the angle of inclination of said head-end support;

a connection means between said main frame and a location on said foot-end support spaced away from said first end thereof, said connection means being operative for lowering the opposite end of said foot-end support on movement of said foot-end support lengthwise of the bed in a direction away from said middle support; and

means for locating said head-end support in selected positions of inclination about its pivotal mounting on said main frame.

3,887,952

MODULAR CONSTRUCTED FIBERGLASS REINFORCED PAPERBOARD BOAT

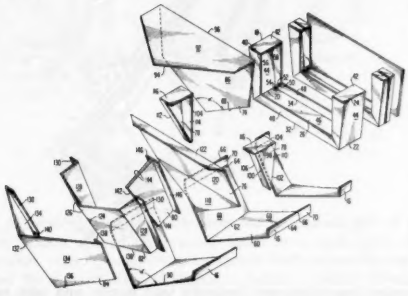
Frank S. Nicoll, Jr., Dolfield Rd., Owings Mills, Md. 21117

Filed Dec. 3, 1973, Ser. No. 420,839
Int. Cl. B63b *5/00*
U.S. Cl. 9—6 **12 Claims**

1. In a marine craft formed of a plurality of separate prefabricated modular units adhesively and sealably fastened together to form a complete hull, the improvement wherein:

each unit is formed of fiberglass reinforced, resin treated waterproof paperboard,

and wherein said units include a number of end to end longitudinally joined unitary hull units, each hull unit being bent into U-shaped cross section including planar, generally vertical sidewalls joined by an integral horizontal planar base portion, a transom spanning the aftmost hull unit, at least one bottom panel commonly underlying said hull units and having its sides overlying and joined to respective planar sidewalls of the hull units and a bow unit including at least one V-shaped bow panel fixed at its rear end to the leading end of the foremost hull unit and at its bottom to the leading end of the foremost bottom panel,



and wherein, each of said longitudinally joined unitary hull units of U-shaped cross section include right angle, integral planar edge walls at longitudinally forward and rear ends of said units which extend at right angles to the sidewalls and horizontal base portion for each hull unit, and wherein said horizontal base portion forms a center wall between said edge walls, and means for mutually sealably coupling the planar edge walls of adjacent abutting units together,

and wherein said bow unit panel includes sidewalls inclined outwardly with respect to the longitudinal center line of the craft, and said bow unit further includes an inverted L-shaped rear panel including vertical and horizontal panel portions terminating in a frontal V-shaped edge and said frontal V-shaped edge conforms to the V-shaped sidewalls of the bow panel, and means for adhesively fixing said panals together to form a watertight hull.

3,887,953

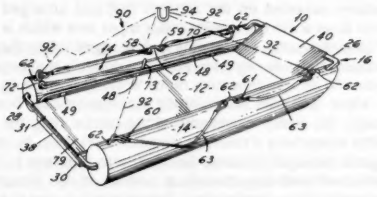
RAFT ADAPTED FOR USE AS A WATER RESCUE OR RECOVERY LITTER

Leigh E. Eisenhauer, 3 Warren Rd., Van Wert, Ohio 45891

Continuation-in-part of Ser. No. 320,103, Jan. 2, 1973 abandoned. This application Dec. 28, 1973, Ser. No. 429,179

Int. Cl. B63c *9/04*

U.S. Cl. 9—11 R **9 Claims**



1. A raft adapted for use as a rescue or recovery litter, comprising an elongated body section, elongated parallel floatable pontoons on opposite sides of said body section, a frame structure connecting said body section and pontoons together, said body section having a flat horizontal upper surface adapted to support a person thereon, said upper surface being disposed below the tops of said pontoons and when said raft is afloat unloaded being disposed near water level, said upper surface extending continuously to the rear end of said raft to provide an unobstructed loading deck portion by means of which a person may be floated onto said upper surface, the undersurfaces of said body section and pontoons having upwardly and forwardly inclined front end portions to facilitate forward movement through the water, said pontoons being spaced laterally outwardly from said body section, said body section having opposite sides extending downwardly beneath said upper surface thereof in opposed confronting relation to said pontoons and cooperating with said pontoons to provide longitudinally extending slots in the underside open at the front and rear for the free flow of water therethrough when said raft is pulled lengthwise through the water, thereby to reduce any tendency of the raft to fishtail, said body section being relatively hard, tough and shock resistant on its surfaces.

3,887,954

MOTOR-DRIVEN WASHING APPARATUS

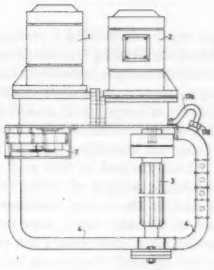
Rolf Gottfrid Carlsson, Kullbackstorpsvagen 21, S-435 00 Molnlycke, Sweden

Continuation-in-part of Ser. No. 270,987, July 12, 1972, abandoned. This application Apr. 26, 1974, Ser. No. 464,635

Claims priority, application Sweden, June 1, 1972, 7168/72

Int. Cl. A47l *1/04*

U.S. Cl. 15—50 C **5 Claims**



1. An apparatus for cleaning vertical surfaces of a ship or building comprising

a. a rail member disposed horizontally on said surface, said rail member having, in cross-section, a horizontal covering portion extending outwardly from said surface, a support portion extending downwardly from the outermost edge of said covering portion, and a horizontal track portion extending inwardly towards said surface from the bottommost edge of said support portion,

b. at least one U-shaped channel disposed horizontally on said surface under said covering portion of said rail member, said channel being operable to receive a conduit, and

c. a movable washing unit comprising

i. a frame;

ii. wheel means rotatably mounted on said frame for engagement with upper surface of said track portion of said rail and operable to support said washing unit during movement along said rail;

iii. means operable to move said washing unit along said rail;

iv. at least one vertical brush means rotatably mounted on said frame for washing engagement with said surface;

v. means operable to rotate said brush means;

vi. wash fluid spray means; and

vii. a hollow arm disposed on said frame so as to ride under said covering portion of said rail upon engagement of said wheel means with said track portion, said arm being operable to receive a conduit at one end from said channel and conduct said conduit through its hollow core to said washing unit.

3,887,955

HEADLIGHT WIPER

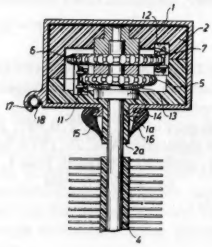
Uro Tapio Järvinen, Satunavagen 18, Marsta, Sweden (19500)

Filed Apr. 9, 1974, Ser. No. 459,306

Claims priority, application Sweden, Apr. 10, 1973, 73050346

Int. Cl. B60s *1/20, 1/44*

U.S. Cl. 15—250.22 **2 Claims**



1. A headlight wiper comprising a stationary body, a carriage mounted for reciprocating movement along a guide way formed in said body, a roatary member mounted in said carriage and serving to carry a generally cylindrical brush, which may be rotated about its longitudinal axis by said member, and a motor-operated drive mechanism for moving the carriage along the guide way and imparting a rotary movement to the rotary member, characterized in that said drive mechanism includes two concentric wheels of mutually different diameter, both connected to the rotary member, and an endless drive means, such as a chain, cable, rope or belt, having two substantially parallel parts extending each on one side of the common rotary axis of said wheels and arranged in engagement each with one of said wheels.

3,887,956

WINDSHIELD WIPER FLUID DISPENSER

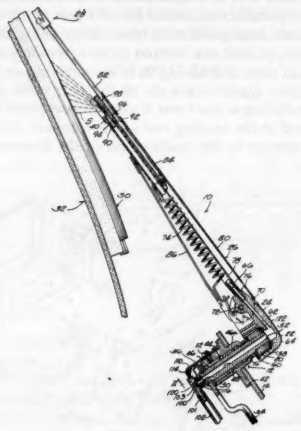
Harold Wind, Kentwood, Mich., assignor to Lescoa, Inc., Grand Rapids, Mich.

Filed Oct. 18, 1973, Ser. No. 407,527

Int. Cl. B60s *1/46, 1/48, 1/52*

U.S. Cl. 15—250.04 **10 Claims**

5. A windshield wiper assembly comprising, in combination: a base for anchoring to the cowling of a vehicle; and drive shaft rotatable in said base; a one-piece integrally formed head member removably anchored to said shaft and rotatable therewith, said head member having a shaft engaging portion and a portion extending radially relative said shaft; a wiper arm attached at one end to said radial portion of said head member; a wiper blade pivotally connected near its center to the other end of said wiper arm; a fluid dispersing nozzle anchored to the underside of said wiper arm near said other end; and conduit means for conveying cleaning fluid to said nozzle from a source comprising a first passageway formed centrally through said shaft, an enlarged central opening in said shaft engaging portion of said head member which communicates with said first passageway when said head member is positioned on said shaft, a second passageway formed centrally through said radial portion of said head member communicating directly with said enlarged opening, and a tubular hose



means interconnected between said nozzle and said radial head portion anchored to the underside of said wiper arm.

3,887,957

HEADLIGHT WIPER

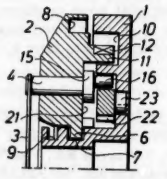
Uro Tapio Järvinen, Satunavagen 18, and Olli Olavi Salminen, Valstavage 58, both of Marsta, Sweden (19500)

Filed Apr. 24, 1974, Ser. No. 463,831

Claims priority, application Sweden, Apr. 27, 1973, 73060022

Int. Cl. B60s *1/20, 1/44*

U.S. Cl. 15—250.16 **8 Claims**

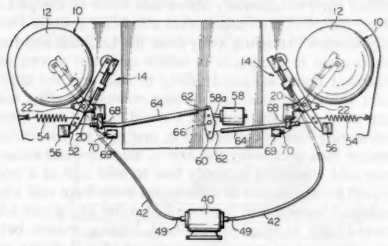


1. A headlight wiper comprising a support ring to be mounted in a stationary position on a headlight, a carrier ring rotatably mounted on the support ring and arranged to be driven from a driving motor, and a wiper arm which is pivotally mounted in the carrier ring and arranged, when the wiper is started, to be swung from an approximately tangential rest position to an approximately radial working position in which the wiper arm will move along the lens of the headlight through the rotary movement of the carrier ring, the wiper further comprising a resetting member carried by the support ring and arranged to cause the wiper arm to return to its rest position without any preceding reversal of the direction of movement of the carrier ring, characterized in that the resetting member is movable between an inoperative position, in which it leaves the wiper arm unaffected thereby, and an operative position, in which it brings the wiper arm to return to its rest position.

3,887,958
HEADLIGHT WIPER MECHANISM FOR A MOTOR VEHICLE

Noburu Fukasawa, Kamakura; Takanori Kitagawa, Yokosuka, and Naohiko Inoue, Yokohama, all of Japan, assignors to Nissan Motor Company Limited, Yokohama, Japan

Filed June 18, 1973, Ser. No. 370,605
Claims priority, application Japan, July 22, 1972, 47-86533
Int. Cl. B60s 1/44
U.S. Cl. 15—250.17 1 Claim



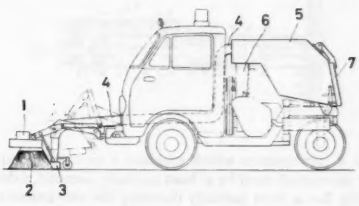
1. A headlight wiper mechanism for two headlights of a motor vehicle spaced transversely apart from each other of the motor vehicle, comprising two pivot shafts rotatably supported by the vehicle and disposed radially outside of said headlights; two wiper arm and rotatable blade assemblies attached to said pivot shafts, respectively for unitary rotation with said pivot shafts: operating means for moving said wiper arm and rotatable blade assemblies between operating positions whereat said wiper arm and rotatable blade assemblies are maintained in engagement with the outer surfaces of said headlights and parked positions whereat said wiper arm and rotatable blade assemblies are disposed radially outside of said headlights; and drive means automatically actuated when said wiper arm and rotatable blade assemblies are in said operating positions for imparting rotation to said rotatable blades of said wiper arm and rotatable blade assemblies, wherein the improvement being in the operating means comprises: two arms connected to said two pivot shafts and extending radially therefrom, respectively; two sets of stoppers, each set of stoppers interposing therebetween one of said two arms, providing an arrangement whereby when each of said two wiper arm and rotatable blade assemblies is in its operating position, each of said two arms engages with a first stopper of each set of said two sets of stoppers, and when each of said two wiper arm and rotatable blade assemblies is in its parked position, each of said two arms engages with a second stopper of each set of said two sets of stoppers; two springs, each resiliently biasing each of said two arms to engage with the second stopper of each set of said two sets of stoppers; mechanical linkage means for oscillating said two arms to engage with said first stoppers of said two sets of stoppers, respectively, against the biasing forces of said two springs when actuated; and a solenoid operable to actuate said mechanical linkage means.

3,887,959
APPARATUS FOR SEPARATION OF AIR AND DUST

Susumu Matsuo, Minamitsushuki 196 Chasen Cho, Shizuoka, Japan

Filed May 14, 1974, Ser. No. 469,812
Int. Cl. A47l 9/10
U.S. Cl. 15—347 2 Claims

1. An apparatus for separating air and dust comprising, in combination, a closed dust hopper disposed to receive and store dust separated from a mixture of air and dust, an air-discharge hole having a flange projecting into said hopper and disposed within a wall of the hopper, an air and dust injection nozzle positioned within said air-discharge hole in coaxial relationship and projecting into said hopper to a lesser extent than said flange, said dust injection nozzle having a cross section similar to that of the air discharge hole and having a cross-sectional area half the cross-sectional area of said air discharge hole, a tubular member coaxial with the dust injection nozzle and disposed within the hopper in front of the dust injection nozzle and spaced from said flange of said air discharge hole to enclose the air current projecting from said dust injection nozzle and to guide air and dust projecting from

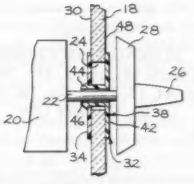


the said injection nozzle to the hopper, a vacuum pump means joined to said air-discharge hole, and a dust collection means, a duct leading from said dust collection means to said dust injection nozzle, whereby dust-containing air passing into the duct is injected into the hopper and separated, the separated dust being collected within the hopper, with the air being removed between the air-discharge hole and said dust injection nozzle.

3,887,960
SHAFT BUSHING TO PREVENT SOIL MIGRATION

George R. Sherman, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Feb. 1, 1974, Ser. No. 438,758
Int. Cl. B65d 7/48; H01b 17/26
U.S. Cl. 16—2 2 Claims



1. A rigid supporting panel having a shaft bushing adjustably mounted in an oversized opening in the panel, said bushing comprising a first member that is larger than the said opening and has an oversized central bore adapted to slip freely over a shaft, said shaft being adapted to be inserted through the said panel opening, and a second interlocking member also being larger than the said panel opening and having a central bore adapted to slip closely over the said shaft, said second member having fastening means engagable in the said oversized bore of the first member and held therewith so that the said opening in the supporting panel is substantially closed by the combined shaft and bushing which extend through the said opening, said bushing being loosely fitted within the said oversized panel opening so as to be capable of lateral adjustment within the plane of the said opening.

3,887,961

DAMPING ASSEMBLIES FOR DOORS OR THE LIKE

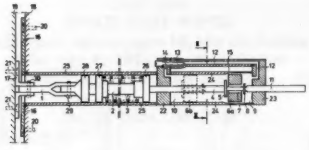
Jaakko Saajos, Virkkalantie 30 A, 08100 Lohja 10, Finland

Filed June 12, 1974, Ser. No. 478,708

Claims priority, application Finland, June 15, 1973, 1947/73

Int. Cl. E05f 3/12

U.S. Cl. 16—56 9 Claims



1. In a combination which includes a movable component whose movement must be at least partially damped, a damping assembly for at least partially damping the movement of said component, said damping assembly comprising a cylinder adapted to contain a damping fluid and having a pair of opposed end walls, a piston in said cylinder, said piston and cylinder forming a pair of members at least one of which is movable along the axis of said cylinder with respect to the other, said piston defining with said end walls a pair of interior cylinder chambers respectively situated on opposite sides of said piston, passage means operatively connected wtih said cylinder and providing communication between said chambers so that during movement of said one member along said axis with respect to the other the damping fluid can flow through said passage means between chambers, a piston rod operatively connected with said piston and extending slideably and fluid-tightly through one of said end walls, and an extension rod operatively connected to said piston and extending therefrom slideably and fluid-tightly through the other of said end walls, said extension rod having substantially the same cross section as said piston rod and said piston rod and extension rod forming a unit in which said piston rod and extension rod do not change their position relative to each other, said piston rod and extension rod respectively extending through said chambers and said extension rod rendering unnecessary any structure to compensate for the lack of a piston rod in that one of said chambers through which said extension rod passes.

3,887,962

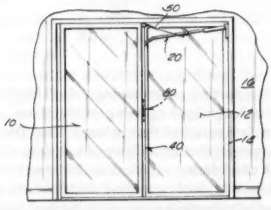
SLIDING SASH CLOSER

Roy Mills, 1128 Karla Dr., Hurst, Tex. 76053

Filed Oct. 15, 1973, Ser. No. 406,523

Int. Cl. E05f 1/08

U.S. Cl. 16—72 9 Claims



1. In a device for moving a sash which is slidable substantially in the plane of said sash and parallel to a sash guide between two extremes of movement defined by the ends of the sash guide; a plurality of relatively movable parts movable in closely spaced parallel planes and including at least one sash and a sash guide having two ends and extending substantially parallel to the sash, means for biasing a said sash toward one of two extreme positions of said sliding part with reference to another said part, said means comprising a roller, an arm having two ends and an axis extending between them, said arm carrying said roller at one said end, said arm having a pivot on its other end, said pivot being mounted on one of said sash and said sash guide, said pivot being oriented respecting the part on which it is mounted so that said arm is movable in a plane including the edge of another of said plurality of relatively movable parts whereby swinging of said arm causes movement of said roller along said edge,

the improvement comprising: biasing means including an anchor fixed substantially above said roller on the part on which the pivot is mounted, said arm being provided with an abutment extending away from the said axis and from said anchor in the plane in which said arm pivots, said abutment being adjustably fixed to said arm for adjustment along said axis, said biasing means including resilient tension means secured to said anchor and linear connecting means connected at one end to the resilient tension means crossing the axis of said arm and secured over said abutment to apply bias to said arm at a point spaced from said axis in a direction away from said abutment to bias said arm to move said roller along said edge toward said biasing means, said biasing means being strong enough to maintain movement of said sliding part to its extreme position after said movement is initiated.

3,887,963

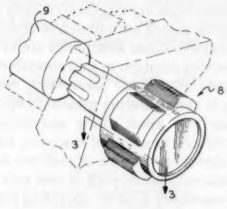
CONTROL KNOB ASSEMBLY

James E. Harmon, Groton; Stephen R. Watrous, Cortland, and Herrick R. Diamond, Homer, all of N.Y., assignors to SCM Corporation, New York, N.Y.

Filed June 19, 1974, Ser. No. 480,649

Int. Cl. A47b 95/02; B25g 1/00; E05b 1/00

U.S. Cl. 16—121 17 Claims



1. A control knob for business machines comprising:

a frame defining a plurality of apertures disposed along the periphery;

a member having a plurality of elevated segments disposed for positioning within said plurality of apertures in said frame and to project therefrom when said member is positioned within said frame;

means for retaining said elevated segments of said member in position within said plurality of apertures in said frame.

3,887,964

FOOD PATTY MOLDING MACHINE

Louis R. Richards, Mokena, Ill., assignor to Formax, Inc., Mokena, Ill.

Filed Jan. 24, 1972, Ser. No. 220,323

Int. Cl. A22c 7/00

U.S. Cl. 17—32 12 Claims

1. A high speed food patty molding machine comprising:

a multiple-cavity, cyclically operable molding mechanism having an inlet for supplying food material simultaneously to all of the cavities, the molding mechanism inlet being closed for a major portion of each molding cycle;

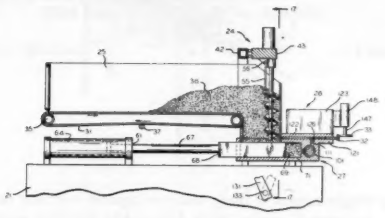
two food pumps, each pump comprising a fixed cavity having an intake opening at one end and an outlet opening at the other end, a plunger aligned with the intake end of

the cavity, and drive means for moving the plunger between a retracted ready position clear of the intake opening in the cavity and a pressure position in which the piston is advanced inwardly of the cavity beyond the intake opening toward the outlet opening;

supply means for supplying moldable food material to the intake opening of each pump cavity whenever the plunger for that pump is in its retracted position;

a manifold connected to the outlet openings of the two pump cavities and having an outlet passageway connected to the molding mechanism inlet to supply a substantially unrestricted flow of food material thereto;

actuating means for actuating the pump drive means in overlapping alternation so that at least one pump cavity



always contains moldable food material under a given mimimum mold-filling pressure and, when the material in one cavity reaches a given minimum volume, both pump cavities contain moldable food material under the aforesaid mold-filling pressure for a limited pump changeover interval;

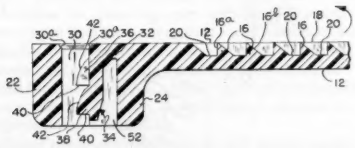
and valve means for sealing off the outlet opening of each pump cavity from the manifold whenever the plunger for that pump is moved toward its retracted position, in an overlapping cycle such that both outlet openings communicate with the inlet to the molding mechanism during a part of said changeover interval, thereby affording a continuous supply of moldable food material, under continuous pressure, at the inlet of the molding mechanism.

3,887,965

BUNDLING TIE

Jerome T. Schuplin, Parma Heights, Ohio, assignor to Fastway Fasteners, Inc., Lorain, Ohio

Filed Sept. 4, 1973, Ser. No. 394,291
Int. Cl. B65d *63/100;* **F16l** *3/22*
U.S. Cl. 24—16 PB **17 Claims**



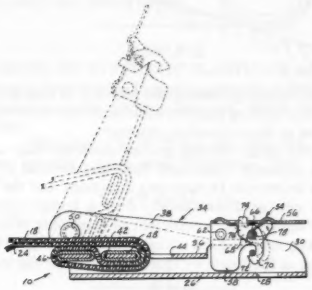
1. A flexible bundling tie including an elongated strap and a head attached to one end thereof adapted for locking coaction with the strap, said strap having teeth formed on one side thereof, said head having a generally vertically extending aperture therethrough adapted to receive the strap, a generally flexible vertically elongated pawl formed on said head and extending into said aperture in the same general direction of extension as the axis of said aperture, said pawl having a plurality of spaced teeth projecting therefrom in said aperture adapted for abutting engagement with respective of the strap teeth to hold the tie in encompassing relation to a bundle, at least certain of said pawl teeth in a direction transverse of said pawl extending laterally a lesser distance than the width of said pawl and being staggered with respect to one another in a direction transverse of said pawl.

3,887,966

HEAVY DUTY TENSION LATCH

Paul R. Gley, Hillsdale, N.J., assignor to Rexnord Inc., Milwaukee, Wis.

Filed July 30, 1973, Ser. No. 383,987
Int. Cl. A44b *21/00*
U.S. Cl. 24—68 CD **6 Claims**



1. A latch and belt assembly for tensioning a flexible belt length along a line of action including in combination, a length of flexible belt having a free end, a mounting bracket having a base, a handle having a bottom and sides extending upwardly from said bottom, said bottom being formed with spaced openings providing a first bottom portion extending between said sides at a location adjacent to one end of said handle and a second bottom portion extending between said sides at a location intermediate the ends of said handle, and means mounting said handle sides on said bracket at a location above said base for pivotal movement around an axis from an open position at which said second bottom portion is above said axis to a closed position at which said second bottom portion is between said axis and said base, said belt length base, the closed position of said handle extending from said free end thereof into said latch past said first and second handle bottom portions on one side of said bottom and around said second bottom portion and between said first and second bottom portions and around said first portion and past said first and second portions on the other side of said bottom and again around said second bottom portion and past said first and second portions on said one side of said bottom and outwardly and away from said latch along a line of action generally parallel to said base so that spaced portions of said belt adjacent to said free end are captured between said second bottom portion and the outwardly extending portion of said belt and between said first bottom portion and the outwardly extending portion of said belt.

3,887,967

SOLAR HEATER PANEL ARRAY SECURING APPARATUS

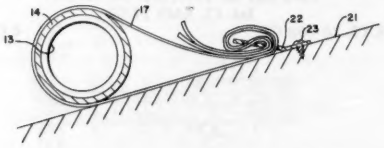
Benjamin Edward Vandenbossche, Menlo Park, Calif., assignor to Fafco Incorporated, Menlo Park, Calif.

Filed Aug. 30, 1974, Ser. No. 501,895
Int. Cl. A44b *21/00*
U.S. Cl. 24—73 PB **10 Claims**

1. An apparatus for securing a solar heating panel array to a supporting structure using heating panels having a flat central portion presenting maximized area to the environment with a plurality of channels extending through the flat central portion for carrying a fluid for exchanging heat with the environment, and having headers on each end of the central portion in communication with the channels, and joints for at-

taching the headers to other headers on adjacent panels for side by side disposition thereby providing increased panel area for contact with the environment, comprising a plurality of first straps for surrounding the joints between the panels on one end thereof,

a plurality of second straps for surrounding the joints between the panels on the other end thereof,



means for receiving ones of said plurality of first and second straps for holding therein, said means for receiving being secured to the supporting structure,

said second straps having greater elasticity than said first straps, whereby when said first and second straps are placed in tension in opposing directions and the heating panels change dimensionally over a temperature range due to temperature coefficient of expansion of the panel material, said second straps yield thereby preventing leakage at the joints by relieving stress on the joints.

3,887,968

COMPOSITE ELASTIC BAND FOR USE WITH A GARMENT

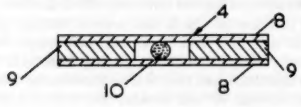
John Edward Lynam, Melton Mowbray, England, assignor to Automatic Braiding Co. (Nottingham) Ltd., Mowbray, England

Filed June 14, 1973, Ser. No. 369,962

Claims priority, application United Kingdom, June 21, 1972, 28932/72; Apr. 10, 1973, 17115/73

Int. Cl. B32b *3/04, 3/24;* **A41f** *9/00*

U.S. Cl. 24—266 **5 Claims**



1. A prefabricated composite elastic band for use in connection with a garment and capable of being stretched elastically from a relaxed condition and of recovery to said condition, comprising a core having two faces including two substantially co-planar elastic ribbons spaced apart from each other with a gap between adjacent edges, a cover composed of a flexible material connected to the core and extending over and covering both faces of the core and covering the gap, and a tie-cord extending freely, within the gap, lengthwise of the band, said tie-cord being puckered when said band is in said relaxed condition.

3,887,969

APPARATUS AND METHOD FOR COOLING A CRIMPED TOW

Wayne K. Erickson, and Albert F. Stegelman, both of Greenville, S.C., assignors to Phillips Petroleum Company, Bartlesville, Okla.

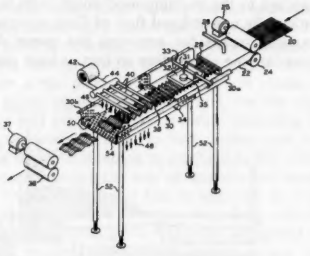
Filed Sept. 14, 1973, Ser. No. 397,259

Int. Cl. D02g *1/12*

U.S. Cl. 28—1.6 **12 Claims**

6. Apparatus for cooling a heated crimped tow of synthetic filaments comprising, in combination:

crimping means; first and second sections, said first section having a surface extending a distance from said crimping means and being positioned for receiving the tow and said second section having a surface which is an extension of, attached to, and extended a distance outwardly from the surface of said first section to receive said tow from said first section, said first section having a surface which is of sufficient length to cool the tow to a temperature such that moderate tension can be applied to the tow in said second section without impairing the crimp retention of the tow;



a weight means to force said tow against said first section, said weight means being fastened to said first section in a manner to prevent horizontal movement and allow vertical movement of said weight means;

a cooling means for contacting said tow with a cooling fluid in said second section; and

withdrawal means positioned subsequent to said second section to remove the tow therefrom.

3,887,970

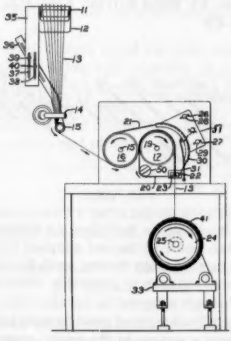
METHOD OF PRODUCING CRIMPED FIBER GLASS

Warren W. Drummond, Allison Park, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 363,912, May 25, 1973, which is a continuation-in-part of Ser. No. 274,951, July 25, 1972, abandoned. This application Dec. 18, 1973, Ser. No. 425,914

Int. Cl. D02g *1/00;* **C03b** *37/04*

U.S. Cl. 28—72.1 **12 Claims**



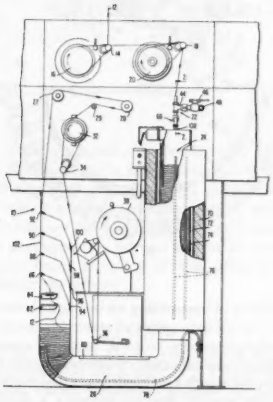
1. A method of producing crimped fiber glass mat comprising passing a plurality of fiber glass strands in an essentially parallel relationship with respect to each other through an attenuating device operating to produce a high rate of speed

in the parallel strands, rapidly projecting the parallel strands being attenuated at a high rate of speed in a substantially straight line from the attenuator, interrupting the path of travel of the paralleled strands by imposing a collection surface for the strands in their path of travel and in close proximity thereto while they are being transmitted in a straight line and before any substantial wave motion is imparted to the paralleled strands and collecting an interlocked fiber glass product on said collection surface.

3,887,971
OUTLET MEANS IN A THERMOPLASTIC YARN REBOUND TEXTURIZING APPARATUS

Lloyd M. Guenther, Severna Park, Md., assignor to Chevron Research Company, San Francisco, Calif.

Filed Dec. 28, 1973, Ser. No. 429,058
Int. Cl. D02j 1/16
U.S. Cl. 28—1.4 **3 Claims**



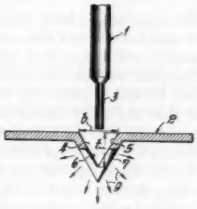
1. In bounce crimping apparatus for texturizing multifilament thermoplastic yarn including:
   - a yarn texturizing chamber having an inlet, a fluid outlet aligned longitudinally with said inlet, and a lateral yarn outlet,
   - means for introducing a heated fluid into said yarn texturizing chamber for drawing yarn into said chamber,
   - a foraminous surface positioned across said fluid outlet of said chamber, said heated fluid introduced into said chamber for drawing yarn into said chamber further serving to hurl the yarn against said foraminous surface to axially compress and crimp the yarn filaments and rebound the yarn through said lateral outlet, and
   - means for collecting the crimped yarn while maintaining the yarn substantially free from longitudinal tension,

the improvement comprising:
   - a tubular member connected to said lateral outlet in said chamber for conveying the crimped yarn from said chamber to said means for collecting the crimped yarn and for continuously axially compacting the yarn as the yarn is conveyed to said means for collection,
   - said tubular member having,
     - a first end connected to said lateral outlet of said chamber for receiving yarn rebounded from said foraminous surface, wherein a central longitudinal axis of said tubular member at said first end extends at right angles with respect to and intersects a central longitudinal axis of said chamber, and
     - a second end for directing the yarn from the tubular member into said means for collecting the crimped yarn,
     - said tubular member being curved such that said curve provides resistance to the passage of yarn therethrough for axially compacting the yarn within the tubular member, and
     - said tubular member being circular in cross section and having an inside diameter slightly greater than the largest dimension of said lateral outlet of said yarn texturizing chamber whereby yarn hurled against said foraminous surface to be axially compressed and crimped and rebound through said lateral outlet may readily enter said tubular member and conform to the shape thereof without substantial buckling of the yarn upon itself as said yarn exits said lateral outlet.

3,887,972
CRIMPING OF SYNTHETIC PLASTIC FILAMENTS

Ernst Bauch, Bordesholm, Germany, assignor to Neumunstersche Maschinen-und Apparatebau Ges. MbH, Neumunster, Germany

Filed July 23, 1973, Ser. No. 381,493
Claims priority, application Germany, July 22, 1972, 2236024
Int. Cl. D02g 1/16
U.S. Cl. 28—1.4 **13 Claims**

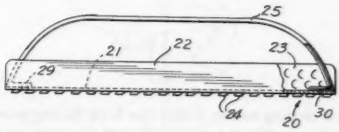


1. In an apparatus for crimping synthetic plastic filaments, a combination comprising first means having a surface; second means for moving said first means so that said surface travels continuously; third means for directing a synthetic filament in plastic state in a path substantially normal to said surface, so as to become crimped by contact with said surface; and a groove formed in said surface into which said filament enters so as to be confined against lateral displacement upon contact with the travelling surface, said groove including a plurality of apertures extending from its interior through said first means.

3,887,973
DISPOSABLE COMBINATION FILE AND HANDLE

James A. Coon, 929 Driver St., W. Sacramento, Calif. 95691

Filed Feb. 26, 1974, Ser. No. 445,954
Int. Cl. B23d 71/04
U.S. Cl. 29—78 **3 Claims**



1. A disposable combined file and handle comprising a generally rectangular plate, a pair of upstanding side walls integrally secured to the opposite side edges of said plate and extending perpendicularly from said plate, a plurality of sharpened file teeth struck from said plate and one of said walls, a bow handle positioned over said plate and including an elongate strip of metal having the opposite side edges thereof

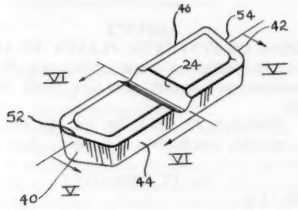
rolled under to provide stiffness of said handle, and a pair of tabs integrally formed on the opposite ends of said handle and bent to engage the upper surface of said plate and spot welded thereto.

3,887,974

CUTTING INSERT AND HOLDER THEREFOR

Edward L. Sorice, Crabtree, Pa., assignor to Kennametal Inc., Latrobe, Pa.

Filed Aug. 1, 1974, Ser. No. 493,560
Int. Cl. B26d *1/00*
U.S. Cl. 29—95 R **9 Claims**



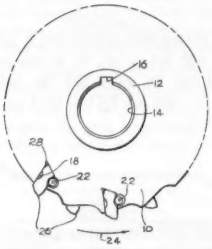
1. A cutting insert comprising: a body of hard wear resistant material having top and bottom and side and end walls, said side walls being parallel and longer than said end walls and said body being symmetrical about an axis perpendicular to said side walls when viewed in plan, one of the longer side walls being shorter than the other thereof whereby said end walls converge toward one side wall of said body, each end wall of the body forming a cutting edge at the junction thereof with the said top wall of the body, said top wall having a flat island area upstanding thereon which at the ends is spaced inwardly from said cutting edges, a land region in the plane of said top wall extending inwardly from each cutting edge, and a fillet at the inner edge of each land region leading upwardly to the plane of said island area.

3,887,975

SLOTTING CUTTER AND CUTTING INSERT THEREFOR

Edward L. Sorice, Crabtree, and Ernest J. Friedline, Latrobe, both of Pa., assignors to Kennametal Inc., Latrobe, Pa.

Filed May 13, 1974, Ser. No. 469,516
Int. Cl. B26d *1/12*
U.S. Cl. 29—105 R **7 Claims**



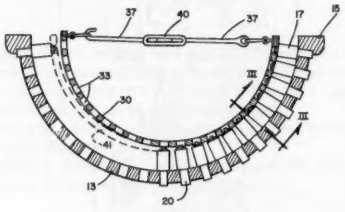
1. In a slotting cutter; a disc like body having parallel side walls and rotatable in a predetermined direction on a central axis perpendicular to the plane of the body, a plurality of pockets formed into each side wall of the body in circumferentially distributed relation with the pockets in one side of the body staggered relative to the pockets in the other side of the body when the body is viewed in the axial direction, each pocket having circumferentially spaced front and rear walls and an axially bottom wall and a radially inner wall and open on the other two sides, said axially bottom wall converging with the respective side wall of the rotatable disc body in the direction of rotation of said disc body and also inclining outwardly toward said disc wall from the radially inner end of said axially bottom wall toward the outer end thereof, a cutting insert in each pocket having parallel front and back walls and parallel side walls perpendicular to said front and back walls, each insert having an end portion protruding radially from said body and presenting a cutting edge, and clamping means for clamping each insert in the respective pocket while simultaneously urging the insert toward the said rear wall and the said radially inner wall of the pocket.

3,887,976

STATOR BLADE ASSEMBLY FOR TURBO MACHINES

J. Rodger Sheilds, 1601 Penn Ave., Pittsburgh, Pa. 15206, and Alexander A. Carroll, 3010 Court Pl., Greensburg, Pa. 15601

Division of Ser. No. 112,163, Feb. 3, 1971, abandoned. This application Feb. 26, 1973, Ser. No. 335,973
Int. Cl. B21k *3/00*
U.S. Cl. 29—156.8 R **3 Claims**



1. The method of assembling an arcuate shroud ring to the inner ends of an arcuate series of stator blades extending in a radial direction inwardly from a machine casing, the ring having apertures spaced apart circumferentially for receiving in registration therewith said blade ends, the method including contracting the shroud ring by applying a force thereto to reduce the diameter of the shroud ring to a diameter less than that described by the ends of the blades in the series whereby at least one blade receiving aperture in the ring is insertable into one of said blade ends,

inserting said one aperture into said one blade end, and

relieving said contracting force to permit the shroud ring to expand whereby the remaining apertures move into receiving registration with the remaining blade ends in said series.

3,887,977

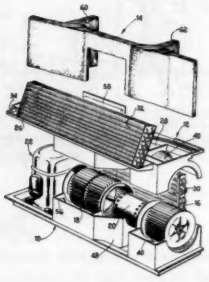
METHOD OF PRODUCING AIR CONDITIONERS

Valerio Giordano Riello, Legnago, Italy, assignor to Riello Condizionatori S.A.S. di Giordano-Riello & Co, Bevilacqua, Verona, Italy

Division of Ser. No. 154,956, June 21, 1971, Pat. No. 3,756,039. This application June 8, 1973, Ser. No. 368,080
Claims priority, application Italy, June 20, 1970, 26327/70
Int. Cl. B25d *23/02, 23/08*
U.S. Cl. 29—157 R **9 Claims**

1. A method of producing an air conditioner having a compressor, a condenser, an evaporator connected to said compressor, and an electromechanical blower unit comprising an electric motor and a pair of blowing fans driven by said motor and arranged with the latter along a common axis, said method comprising the steps of molding a pair of three-dimensional structural components each having a wall of substantially rectangular outline; placing said motor and said fans on said wall of rectangular outline of one of said structural components; connecting said walls of rectangular outline by additional walls extending substantially normal thereto and

defining between said walls of rectangular outline at least in part three recesses respectively housing said motor and said fans, with each of said walls of rectangular outline projecting with portions thereof beyond said additional walls; forming in said structural components air passages providing communication between said recesses and communication of said recesses with the surrounding atmosphere; mounting said compressor and said condenser on said portions of said wall of



rectangular outline of said one component which projects beyond said additional walls; and mounting said evaporator on a portion of said wall of rectangular outline of said other component which projects laterally beyond said additional walls, said condenser being mounted on said one component to project in part upwardly beyond said other component and said evaporator being mounted on said other component to project upwardly therefrom.

3,887,978

MANUFACTURING OF BEVEL GEAR BY COLD FORMING OF BLANKS IN A PRESS DIE

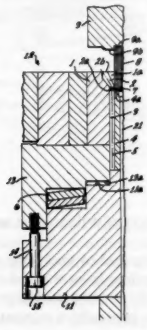
Fritz Dohmann, Furth, Germany, assignor to Kabel-und Metallwerke Gutehoffnungshutte AG, Hannover, Germany

Filed Apr. 8, 1974, Ser. No. 459,161

Claims priority, application Germany, Apr. 21, 1973, 2320336

Int. Cl. B21j *5/12*

U.S. Cl. 29—159.2 **6 Claims**



1. In an apparatus for forming bevel gear, including a die with bevel gear forming die cavity, a punch acting from the side of largest diameter of the die cavity and a counter punch acting from the side of smallest diameter, the improvement, comprising:

a continuation portion of the die cavity having gear shaped cross-sectional contour corresponding to the smallest, bevel-gear-defining cavity portion, and having longitudinally cylindrical configuration;

the counter punch positioned in said continuation portion of the die cavity and having correspondingly gear like cross-section; and

means for advancing the counter punch during the last phase of the relative advance of the punch.

3,887,979

MANUFACTURING PROCESS OF A ROLLED GEAR

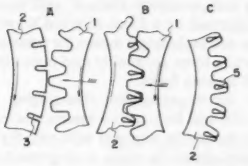
Minoru Kamiya, 2-46-3 Minami Otsuka, Tokyo, Japan

Filed July 1, 1974, Ser. No. 484,754

Claims priority, application Japan, Mar. 6, 1974, 49-025912

Int. Cl. B21h *5/00;* **B23p** *15/14;* **B29d** *15/00*

U.S. Cl. 29—159.2 **7 Claims**



6. A method of manufacturing a rolled gear having an elastic tooth profile comprising the steps of forming spaces on the periphery of the gear material at a pitch consistent with that of the gear to be produced, and forcing a rolling dye against said gear material with a force sufficient to deform the gear material and form a water drop-like gap in a portion of the tooth profile.

3,887,980

NUCLEAR FUEL BUNDLE DISASSEMBLY AND ASSEMBLY TOOL

Jack Yates, and John W. Long, both of Richland, Wash., assignors to Exxon Nuclear Company, Inc., Bellevue, Wash.

Filed Mar. 29, 1973, Ser. No. 345,831

Int. Cl. B23p *19/04*

U.S. Cl. 29—200 D **7 Claims**

1. A tool for assembling and disassembling a nuclear power reactor fuel bundle of the type having a plurality of tie rods in parallel array, each of said rods being secured at one end to a lower tie plate disposed normal to the axes of said tie rods

and the other end extending through openings in an upper tie plate, said tie plates having openings for accepting and positioning fuel rods in parallel array therebetween, and wherein each of said tie rods is provided with an elongated slot near the end extending through said upper tie plate for receiving the tines of a locking fork to secure said tie plates against separation by compressed springs mounted therebetween, said tool comprising in combination:

(a) a means for depressing said upper tie plate relative to said tie rods and toward said lower tie plate against the pressure of said compressed springs by acting against a rigid support fixed in position relative to said lower tie plate and thereby exposing said tie rod slots;

(b) locking fork carrier means for engaging and moving said locking forks in a direction substantially parallel to said upper tie plate after said upper tie plate has been depressed by said depressing means of (a), said carrier means mounted on said depressing means and capable of moving independently thereof, said fork carrier means being operated by a force directed normal to said upper tie plate and including a means for translating said normal force into a force parallel to said upper tie plate for moving said locking forks;

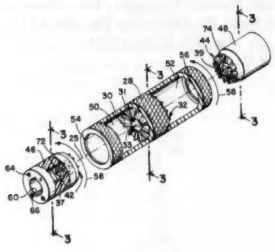
c. means for engaging and disengaging said depressing means and said fork carrier means whereby said depressing means may be engaged with said fork carrier means when said upper tie plate is depressed and disengaged when said locking forks are moved by said carrier means.

3,887,981

INSTALLATION TOOL FOR WIRE CONNECTORS

Charles F. Mazzeo, Scotch Plains, and Anthony J. Santos, Edison, both of N.J., assignors to Amerace Corporation, New York, N.Y.

Filed June 24, 1974, Ser. No. 482,239
Int. Cl. B25b *27/02*; **H05k** *13/00*
U.S. Cl. 29—203 H **11 Claims**



1. A hand operable installation tool comprising

a. a substantially hollow elongated body member, said body member being provided with an internally extending annular flange at each end;

b. two cylindrically-shaped wrench heads, one of said wrench heads being adapted to rotate within the hollow at each end of said body member and being adapted to be retained therein by said annular flanges, said wrench heads being provided with a receptacle on the outer end thereof complementary in shape to said wire connector for receiving the latter therein; and

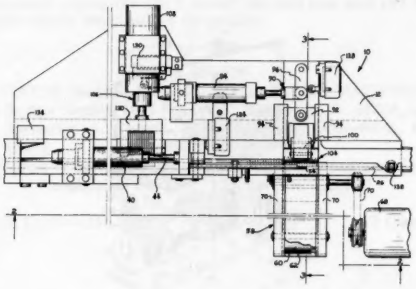
c. one-way clutch means engageable between each of said wrench heads and said body member, said one-way clutch means being adapted to transmit torque applied to said body member to said wrench heads for causing said wrench heads to rotate unidirectionally about the longitudinal axis of said body member.

3,887,982

SUBSTRATE LOADER

Robert W. Delisle, Dover, Pa., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.

Division of Ser. No. 388,363, Aug. 15, 1973. This application July 31, 1974, Ser. No. 493,232
Int. Cl. H01r *43/00*
U.S. Cl. 29—203 DS **2 Claims**



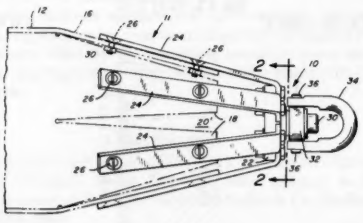
1. Substrate loading apparatus including a terminal feed path for a carrier strip having a number of clip-type terminals extending therefrom, means for loading successive substrates on terminals on the carrier strip located in a work zone, feed means for incrementally indexing the carrier strip along the feed path, and means located adjacent the feed path upstream from the first named means for blanking a selected number of terminals from the carrier strip.

3,887,983

PIPE PULLING TOOL

William F. Province, Bartlesville, Okla., assignor to The Ridge Tool Company, Bartlesville, Okla.

Continuation of Ser. No. 318,002, Dec. 26, 1972, abandoned. This application Aug. 5, 1974, Ser. No. 495,060
Int. Cl. B23p *19/04*
U.S. Cl. 29—234 **9 Claims**



1. The combination of a liner pipe and a liner pipe pulling means, comprising:

a. a liner pipe, one end of said liner pipe having a plurality of fingers extending from the end of the pipe and spaced circumferentially around said pipe, said fingers bent inwardly to form generally a truncated conical surface;

b. said pulling means comprising: axial support means; a plurality of circumferentially spaced straps attached to said axial support means; said straps expanding outwardly from the axis to form generally a conical surface;

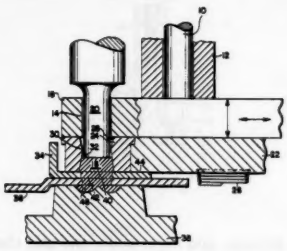
c. means to removably attach each of said straps individually to one of said fingers; and

d. means to attach a tensile means to said axial support means.

3,887,984
RIVETING APPARATUS AND METHOD

Irving Erlichman, Wayland, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Division of Ser. No. 303,065, Nov. 2, 1972, Pat. No. 3,828,421. This application Mar. 15, 1974, Ser. No. 451,341
Int. Cl. B23p *11/00*
U.S. Cl. 29—243.53 6 Claims

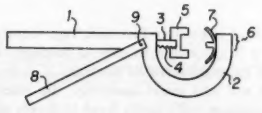


1. Riveting apparatus comprising a support, a guide and clamp member connected to said support for reciprocating movement relative to said support, means normally biasing said guide and clamp member to a first position, said guide and clamp member being provided with a passageway extending therethrough and including a restricted orifice, slug feed means for feeding a slug having a diameter slightly greater than the diameter of said orifice to a position contiguous to one end of said passageway and in alignment with said passageway, an anvil for supporting parts to be riveted with holes through the parts in substantial alignment with said passageway and adjacent the other end thereof, means to force said slug through said passageway so that the pressure generated as said slug passes through said orifice overcomes the action of said biasing means and moves said guide and clamp member into clamping engagement with said parts, said anvil being provided with recess means for reception of a portion of said slug to form cap means on one end of said slug.

3,887,985
DEVICE FOR MOUNTING AND DEMOUNTING GUIDES ON A CARRYING ROD

Raymond A. Zenon, Abbeville, La., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed May 20, 1974, Ser. No. 471,181
Int. Cl. B25b *27/02*
U.S. Cl. 29—267 5 Claims

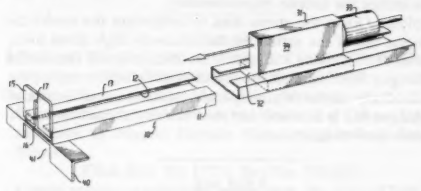


1. In a device for removing an object from a carrying rod, said object being adapted to be forcibly slide onto said carrying rod by way of a longitudinally extending groove therein, said device having means for forcing a first member thereof toward and away from a spaced apart opposing second member thereof, the improvement comprising a support means carried by one of said first and second members, said support means having spaced apart upstanding sections for supporting said carrying rod on opposite longitudinal ends of said object so that said object is spaced away from said support means, and a press means carried by the other of said first and second members opposite said support means, said press means for bearing against an object carried by said support means to press said object onto or off of its carrying rod, said press means having a longitudinally extending indentation therein for receiving said object, and shoulder means on both sides of said indentation for contacting said object on either side of said groove in said object.

3,887,986
DRIVE CAP GUIDE ASSEMBLY FOR INTERCONNECTING ADJOINING SHEET SECTIONS

Mace Edward Walton, 8008 Holly Ave., Waldorf, Md. 20601

Filed Mar. 5, 1974, Ser. No. 448,391
Int. Cl. B25b *27/16*
U.S. Cl. 29—271 11 Claims



1. In a guide assembly for interconnecting adjoining sheet sections together with a drive cap, the adjoining edges of the sheet sections being shaped to mate with the drive cap to effect interconnection thereby, comprising:

a. a first guide section comprising a long channel to receive the drive cap, having an entry end through which the drive cap enters and an exit end through which the drive cap exists, and further defining a slit at the top portion thereof to receive any vertical extension of the drive cap,

b. a second guide section secured to the top portion at the exit end of the first guide section to guide said any vertical extension of the drive cap during the interconnection operation, the first and second guide sections being shaped to securely support the drive cap and prevent distortion thereof during the interconnection operation,

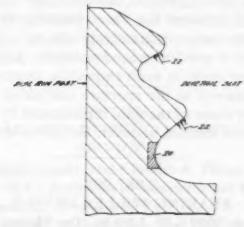
c. drive means to drive the drive cap through the first and second guide sections, and

d. an angle stop attached beneath the first guide section at the exit end of the first guide section and defining a notched section for receiving a bar slip.

3,887,987
METHOD OF MAKING, AND OF MEASURING ARTICLE FATIGUE LIFE

Trevor L. Salt, Beverly, Mass., assignor to General Electric Company, Lynn, Mass.

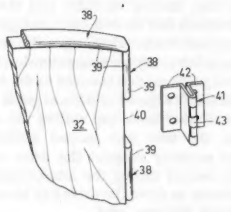
Division of Ser. No. 323,349, Jan. 15, 1973. This application July 29, 1974, Ser. No. 492,862
Int. Cl. B23q *17/00*
U.S. Cl. 29—407 4 Claims



1. A method for making an article having at least a minimum selected useful fatigue life under certain operating conditions, the article being made of a selected material, comprising the steps of:

making an initial design for the article;
selecting from the design an area of relatively high stress;
obtaining stress/strain data for the selected material;
obtaining stress intensity/crack growth data and at least one fatigue characteristic for the selected material;
determining a characteristic material defect length (λ) for the selected material by:
a. selecting at random a first characteristic material defect length for the selected material; and then
b. comparing and modifying the length of the initial characteristic material defect length with the stress/strain data and stress intensity/crack growth data in an literative method until a characteristic material defect length (λ) matches the fatigue characteristic;
applying (λ) to the stress data to determine the useful fatigue life of the article in the relatively high stress area, and then making the article to the design if the useful fatigue life is at least the selected minimum or reshaping the design of the relatively high stress area until the useful fatigue life is attained and then making the article to the reshaped design.

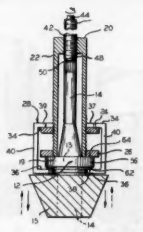
3,887,988
METHOD OF PRODUCING FURNITURE
Walter John Mortlock, 46 Macarthur Rd., East Camden, New South Wales, Australia
Filed Aug. 29, 1973, Ser. No. 392,390
Int. Cl. B23p *17/00*
U.S. Cl. 29—416 **11 Claims**



1. A method of producing for furniture a frontispiece of sheet material provided with at least one aperture for access therethrough and a displaceable panel to occupy the aperture, said method comprising cutting out said panel from said sheet material to leave an aperture in the latter, and securing edging strips in such respective positions that when the panel is returned to the aperture said strips are located to occupy at least some of the gap, of the cut, between the panel and the sheet.
6. A method of producing for furniture a frontispiece of sheet material provided with at least one aperture for access therethrough and a displaceable panel to occupy the aperture, said method comprising placing said sheet material on a worktable adjacent a rotatable routing tool, advancing the routing tool to cut into the sheet material, imparting predetermined relative movement between the sheet material and the routing tool whereby the latter progressively cuts out a panel from the former to leave a predetermined aperture, and subsequently securing edging strips in such respective positions that when the panel is returned to the aperture said strips are located to occupy at least some of the gap, represented by the cut of the routing tool, and located between the panel and the sheet.

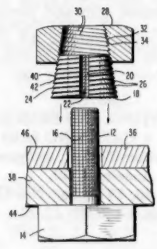
3,887,989
BEARING PULLER DEVICE
Wade Maynard, 7009 S.W. 14th St., Des Moines, Iowa 50309
Filed Feb. 7, 1973, Ser. No. 330,211
Int. Cl. B23p *19/02*
U.S. Cl. 29—427 **17 Claims**

1. A bearing puller device to remove or position a bearing assembly from its seat on a shaft, said puller comprising:
a tubular member;
an upper collar and a lower collar associated with said tubular member, each of said collars being adjustable on said tubular member; and
clamp means for gripping said upper collar and said bearing assembly, said bearing assembly being operatively positioned between said lower collar and said clamp means, said bearing assembly being removed or positioned on said seat by the application of an external force to said shaft.



10. The method of claim **9**, wherein said shaft extends outward from said bearing assembly and said method further comprises positioning said tubular member over said shaft.

3,887,990
METHOD OF SECURING TWO MEMBERS TOGETHER WITH A FASTENER
Floyd Leroy Wilson, P. O. Box 203, Manhattan, Kans. 66502
Filed Dec. 11, 1972, Ser. No. 313,619
Int. Cl. B23p *11/02, 19/00, 19/02*
U.S. Cl. 29—450 **5 Claims**

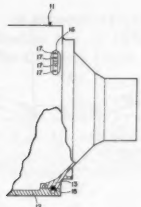


3. A method of releasably fastening two members together by providing a stud located to extend through the members and having an exposed serrated portion;
providing a nut and insert assembly, the insert having an interior opening sufficiently large to freely slide over the serrated portion of said stud and having an outer surface which is tapered relatively to the walls of the inner surface of said nut the surface of the interior opening of the nut being threaded;
slipping said insert-nut assembly over the serrated portion of said stud; and
applying an axially directed compressive impact between one end of the stud and the insert-nut assembly thereby to compress the interior surface of the insert into locking engagement with the serrated portion of the stud while advancing the nut along the outer surface of the insert with the nut being locked to the insert outer surface to prevent relative axial movement by coacting threads after application of the compressive force except through rotation of said nut relative to said insert.

3,887,991
METHOD OF ASSEMBLING A SAFETY DEVICE FOR ROCKETS

Edward A. Panella, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 17, 1974, Ser. No. 470,892
Int. Cl. B23p *11/02*
U.S. Cl. 29—450 **3 Claims**

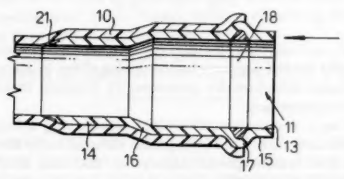


1. A method for fastening closures and a rocket motor case together comprising the steps of:
   a. providing an externally grooved closure;
   b. providing an internally grooved cylindrical motor case;
   c. aligning the grooves;
   d. inserting a resilient wire having a cross section larger than the groove in the closure and smaller than the groove in the motor case in the aligned grooves;
   e. resiliently drawing the ends of the wire together; to move the wire into the groove in said closure, and
   f. fastening the ends of the wire together with a locking clip fabricated from a material which will retain its streenth at temperatures up to a predetermined temperature and then fail whereby the wire will spring out of the groove in the closure and into the groove in the motor case to release the closure from the motor case.

3,887,992
PROCESS OF PRODUCING A SOCKET JOINT BETWEEN A PAIR OF LENGTHS OF THERMO-PLASTIC PIPE

Gunnar Parmann, Mathopen, Norway, assignor to Rieber & Son Plastic-Industri A/S, Bergen, Norway

Continuation of Ser. No. 236,857, March 22, 1972. This application Mar. 4, 1974, Ser. No. 447,480
Claims priority, application Norway, Apr. 1, 1971, 1223/71
Int. Cl. B23p *11/02*
U.S. Cl. 29—450 **3 Claims**

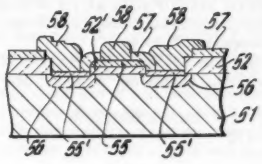


1. A process for producing a socket joint between a pair of lengths of thermoplastic pipe, comprising providing an internally calibrated pipe end receptive socket in one end of one of said pipe lengths by telescopically pushing axially into the core of said pipe end while the latter is in a heated elastically-deformable condition a one-piece and annularly continuous sleeve mould having a through bore with an annular gasket ring-carrying groove therein and an outwardly tapered leading end insertable in said pipe bore and being of greater outer transverse dimensions than the diameter of said pipe bore receptively to expand and shape this pipe end progressively in conformity to the exterior contour of said sleeve mould, leaving said sleeve mould telescoped within said expanded pipe end to serve as a non-displaceable and permanent internal reinforcing member therefor with the bore of said sleeve mould having at least an annular section into which one end of the other of said pipe lengths can be snugly fitted, providing a gasket ring in said ring-carrying groove, and telescoping said end of the other of said pipe lengths into said annular section of said sleeve mould bore with a snug fit thereby providing said socket joint.

3,887,993
METHOD OF MAKING AN OHMIC CONTACT WITH A SEMICONDUCTOR SUBSTRATE

Takashi Okada; Sokichi Yamagishi; Mototaka Kamoshida; Tomomitsu Satake, and Sadayuki Kishi, all of Tokyo, Japan, assignors to Nippon Electric Company, Limited, Tokyo, Japan

Filed Aug. 27, 1973, Ser. No. 391,820
Claims priority, application Japan, Aug. 28, 1972, 47-85288
Int. Cl. B01j *17/00*
U.S. Cl. 29—571 **5 Claims**



1. A method of producing an insulated-gate field effect transistor comprising the steps of forming a gate insulator film on a predetermined surface region of a semiconductor substrate of one conductivity type, forming first, second and third layers of a metal, each of said metal layers containing an impurity of the opposite conductivity type on first and second surface regions of said semiconductor substrate and on said gate insulator film respectively, said first and second surface regions being adjacent to said predetermined surface region and being separated from each other, and subjecting said semiconductor substrate with said gate insulator film and said first, second and third layers of metal deposited thereon to heat treatment, to thereby diffuse said impurity contained in said first and second layers of metal into said first and second surface regions of said semiconductor substrate and form a compound of said metal and said semiconductor at said first and second surface regions, whereby said first surface region, said gate insulator film and said second surface region serve as the source region, gate insulator and drain region, respectively, of the field effect transistor and said compound of said metal and said semiconductor at said first and second surface regions serves as ohmic contacts to the source and drain regions of the field effect transistor.

3,887,994
METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE

San-Mei Ku, Poughkeepsie, and Charles A. Pillus, Wappingers Falls, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

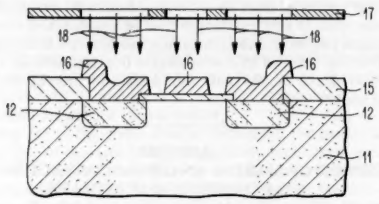
Filed June 29, 1973, Ser. No. 375,295
Int. Cl. B01j *17/00*; **H01l** *7/54, 11/14*
U.S. Cl. 29—571 **13 Claims**

1. A method of manufacturing a semiconductor device having a substrate of a semiconductor material with an insulating layer thereon and a metal film overlying the insulating

layer and in contact with at least one portion of the substrate to form an electrode layer including the steps of:

implanting ions into the metal film;

selecting the ions from the group consisting of hydrogen, helium, silicon, neon, argon, carbon, aluminum, nitrogen, oxygen, copper, gold, xenon, and krypton;



selecting the dosage of the ions to prevent an increase in the fast surface state density;

and controlling the energy level of the ions to position all of the implanted ions within the metal film.

3,887,995

PROCESS OF MANUFACTURE OF SOLAR CELLS

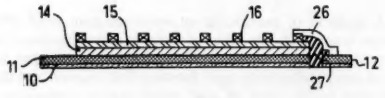
Andre Gauthier, Paris, France, assignor to Societe Anonyme de Telecommunications, France

Filed July 12, 1973, Ser. No. 378,521

Claims priority, application France, July 28, 1972, 72.27227

Int. Cl. H01l *15/02*

U.S. Cl. 29—572 **3 Claims**



1. A process for manufacturing a solar cell comprising two electrodes, a collector grid, a copper sulphide layer and a cadmium sulphide layer, said process comprising depositing on an insulating support a conductive layer or film in two distinct areas separated by a zone in which the insulating sheet remains bare, successively depositing on one of said areas a layer of CdS and a layer of Cu_2S, forming a mask on the layer of Cu_2S, electrolytically depositing a metal on said masked layer of Cu_2S by using said conductive layer deposited on said first area as a cathode for an electrolysis device and removing the mask on said layer of Cu_2S.

3,887,996

SEMICONDUCTOR LOADING APPARATUS FOR BONDING

Ronald J. Hartleroad, Twelve Mile, and James P. Grabowski, Carmel, both of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed May 1, 1974, Ser. No. 466,024

Int. Cl. B01j *17/00*

U.S. Cl. 29—583 **6 Claims**

1. An apparatus for transferring and positioning integrally leaded semiconductor chips onto a probe for bonding to lead frame structures, said apparatus comprising:

a base member having a flat major surface;

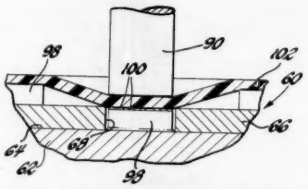
an elongated groove in said surface of the base member;

an elongated slide member slidably disposed in said groove, said slide member having at least one aperture therethrough providing a cavity into which a semiconductor chip can be inserted;

means on said base member surface for retaining said slide member in the groove;

a flexible carrier having at least one integrally leaded semiconductor chip affixed thereto wherein the integral chip leads are contiguous said carrier;

means for supporting said flexible carrier so that said chip is positioned over said aperture in the slide member, said carrier being responsive to a downward pressure so as to insert said chip into said aperture;



an opening in said groove extending orthogonally from the groove through the base member so that a bonding probe may extend therethrough; and

means for stopping translational movement of said slide member after it has stripped said chip from said carrier so that said chip is automatically positioned over said opening whereby said probe may engage the back side of the chip and raise it into aligned engagement with an overlying lead frame structure for bonding.

3,887,997

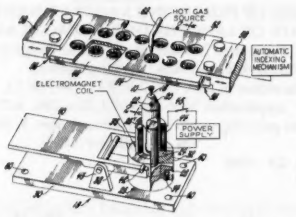
MAGNETIC ALIGNMENT FOR SEMICONDUCTOR DEVICE BONDING

Ronald J. Hartleroad, Twelve Mile; James C. Krajewski, and Ronald G. Rayon, both of Kokomo, all of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 9, 1973, Ser. No. 414,274

Int. Cl. B01j *17/00*

U.S. Cl. 29—589 **4 Claims**



1. A self-aligning method of automatically transferring integrally leaded semiconductor device chips to a conductive lead frame structure for permanently bonding thereto, said method comprising:

placing a semiconductor device chip having a face with a plurality of soft ferromagnetic integral leads thereon on a soft ferromagnetic support so that said chip face is oriented upwardly,

positioning the support so that said chip is in closely spaced relation under an overlying conductive lead frame having a soft ferromagnetic convergent cantilevered finger set that has free ends corresponding to said integral leads on said chip, with said integral leads being in close proximity with said corresponding finger free ends,

applying a magnetic field generally perpendicularly to said chip and said finger set to precisely align said integral chip leads with corresponding finger free ends and to concurrently magnetically raise said chip from said sup-

port up to said finger free ends to produce a uniform intimate engagement between all of said integral chip leads and their corresponding finger free ends, and

bonding said integral chip leads to said finger free ends.

3,887,998

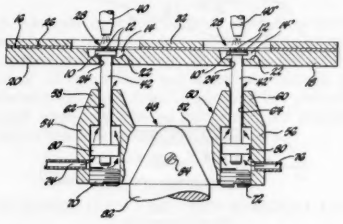
AIR-BIASED PROBE FOR SEMICONDUCTOR DEVICE BONDING

Ronald J. Hartleroad, Twelve Mile, and James P. Grabowski, Carmel, both of Ind., assignors to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 414,521, Nov. 9, 1973, abandoned. This application Apr. 4, 1974, Ser. No. 458,004

Int. Cl. B01j *17/00*

U.S. Cl. 29—589 **4 Claims**



1. A self-aligning method of automatically transferring integrally leaded semiconductor device chips to a conductive lead frame and for automatically consistently producing uniform low stress bonds therebetween, said method comprising:

inserting a semiconductive device chip into each of a plurality of spaced recesses in an upper surface of a carrier template, each of said chips having a face with a plurality of soft ferromagnetic integral leads thereon, with each of said chip faces being oriented upwardly;

supporting on said template upper surface a conductive lead frame having a plurality of soft ferromagnetic finger sets in register over corresponding template recesses, with said fingers corresponding to said integral chip leads;

raising said chips on soft ferromagnetic supports into close proximity with the underside of their overlying finger sets; magnetically raising said chips up off their supports into engagement with their overlying finger sets and precisely aligning them therewith;

re-engaging the backside of the chips with their respective supports without further significantly elevating said chips and overstressing said lead frame fingers;

flowing a hot gas onto said finger sets and said chips while said chips are in re-engagement with their respective supports to bond said integral chip leads to their corresponding lead frame fingers without disturbing said precise alignment therebetween;

terminating said flow of hot gas; and

withdrawing the supports from said chips.

3,887,999

METHOD AND APPARATUS FOR VARYING THE RELATIVE LENGTH OF A PLURALITY OF LEADS AND FOR PERFORMING WORK OPERATIONS ON THE ENDS OF LEADS OF DIFFERING RELATIVE LENGTH

Milton Dean Ross; Kenneth Foster Folk, and Walter Clifton Shatto, Jr., all of Harrisburg, Pa., assignors to William J. Keating, Esq., Harrisburg, Pa.

Continuation-in-part of Ser. No. 389,924, Aug. 20, 1973. This application Dec. 12, 1973, Ser. No. 424,129

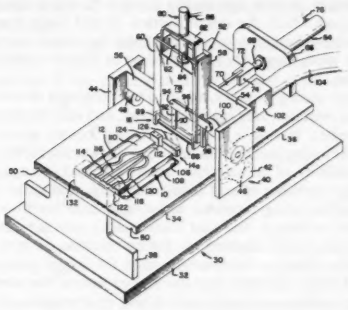
Int. Cl. H01r *43/00*

U.S. Cl. 29—628 **27 Claims**

1. A method of varying the relative length of a plurality of leads, comprising the steps of:

providing an apparatus including a template having a plurality of spaced apart grooves, each groove having spaced apart first and second portions;

holding portions of the plurality of leads in fixed relationship to each other adjacent the first portion of the grooves;



positioning portions of the leads which extend away from the held portions of the leads in said plurality of grooves with said positioned portions extending between said first and second portions of the grooves; and

varying the relative length of the leads which extend away from the held portions of said leads between the first and second portions of the grooves while holding the leads and maintaining portions of said plurality of leads in said second portions of said plurality of said grooves.

3,888,000

FRUIT AND VEGETABLE CUTTING DEVICES

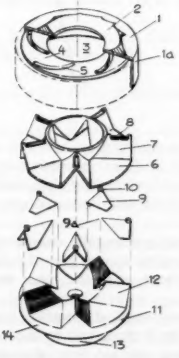
Frank Willows Ladlow, Sea Croft Lodge, 133 Drummond Rd., Skegness, England

Filed June 21, 1973, Ser. No. 372,403

Claims priority, application United Kingdom, June 23, 1972, 29422/72; Jan. 5, 1973, 505/73

Int. Cl. A21c *5/08;* **B26b** *27/00*

U.S. Cl. 30—114 **2 Claims**



1. A cutting device, adapted to bisect tomatoes, other eatable produce and the like into portions having castellated edges, comprising:

a base member having a plurality of angular upstanding portions, and having a tomato-receiving center space;

a plurality of angular blade members with upstanding spigot portions, said blade members adapted to rest freely upon

the angular upstanding portions of said base member and to be reciprocably slidable thereupon;

a blade holder member, adapted to fit matingly over said base member and said blade members, having a tomato-receiving center space, having a plurality of angular upstanding portions corresponding to the angular upstanding portions of said base member, each blade holder member angular upstanding portion having a spigot slot through which the spigot portion of said blade members is adapted to project and in which the spigot portion of said blade members is adapted to be free to reciprocally slide;

an outer casing member, adapted to engagingly fit over said base member, said blade members, and said blade holder member, having a tomato-receiving center space, said outer casing member having a top under cam surface with a plurality of arcuate cam tracks adapted to engage the spigot portions of said blade members, said outer casing member being rotatable about said base member, said blade members, and said blade holder member; and

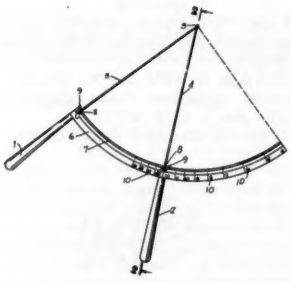
said cam tracks adapted to, during rotation of said outer casing member, reciprocally slide the spigot portions of said blade members radially inward toward the center of the tomato-receiving center space, thus reciprocally sliding simultaneously all of said blade members on the angular upstanding portions of said base member towards the center of the tomato-receiving center space.

3,888,001

ADJUSTABLE CUTTER FOR CAKES AND PIES

David Mervyn Gilbart-Smith, 1651 Harwood St., Apt. 1105, Vancouver, Canada

Filed June 24, 1974, Ser. No. 482,016
Int. Cl. A21c *15/04*
U.S. Cl. 30—114 **1 Claim**



1. A device for cutting pies, cakes or the like into a predetermined number of slices and comprising:

first and second horizontally elongated cutting blades lying in vertical planes with bottom disposed horizontal cutting edges;

first and second horizontally elongated handles, each handle being secured to one end of a corresponding blade;

means pivotally securing the other ends of the blades together;

first and second vertical threaded bolts, each bolt being secured at its bottom end to the corresponding handle and extending upward from the one end of the corresponding blade;

a horizontal flat curved member defining a circular arc, said member having a curved slot also defining a circular arc, said slot and said member having the same center of curvature, the bottom of said member having spaced radially extending straight recesses, said bolts extending upwards through the curved slot whereby the blades can be rotated in the slot about the means and said one end of each blade can be disposed in any one of said recesses; and

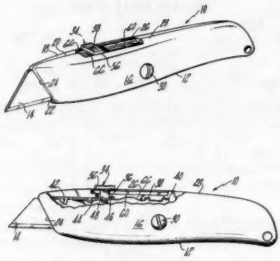
first and second wing nuts, each nut being secured to the top end of a corresponding bolt and overlying said member.

3,888,002

UTILITY KNIFE

James Joseph Graham, Wallingford, Conn., assignor to The Stanley Works, New Britain, Conn.

Filed May 9, 1974, Ser. No. 468,461
Int. Cl. B26b *1/08*
U.S. Cl. 30—162 **3 Claims**



1. In a knife comprising a knife blade, an elongated handle having a blade position adjusting recess extending longitudinally along the handle and an interior latching surface adjacent the recess, a blade carrier mounting the blade for slideable movement relative to the handle, said carrier including a latching member cooperating with the latching surface for releasably latching the blade in one of a plurality of selected positions, and an operating member secured to said latching member and adapted for moving the latching member out of engagement with the latching surface and for moving the blade carrier along the handle, the combination wherein said operating member includes a stem portion and an enlarged head portion rotatably mounted on the stem portion, said stem portion having a top shoulder with an integral, inverted frustoconical spindle projecting upwardly therefrom and said head having a complementary frustoconical aperture of substantially the same size, said spindle being nonreleasably positioned within said aperture with said head engaging said spindle and said top shoulder to prevent axial displacement of said head from said spindle while permitting relative rotation therebetween, said head having a width less than the width of said recess to permit movement into and along said recess during movement of the blade between selected positions and a length greater than the width of said recess, said frustoconical spindle and aperture connection permitting rotation of said head into a recess-bridging locked position only when said latching member is positioned within one of said selected latching positions, said head in its recess-bridging locked position cooperating with said handle to prevent depression of said stem and inadvertent unlatching of the latching member for movement of the blade out of its selected position.

3,888,003

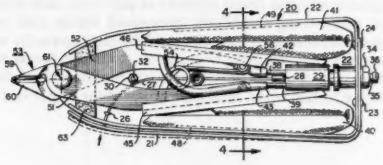
POWER HANDLE FOR PIVOTALLY INTERCONNECTED LEVER TOOLS

Frank R. Brown, Clinton St., Antrim, N.H. 03440

Filed July 12, 1974, Ser. No. 488,078
Int. Cl. B26b *17/00*; B25b *7/00*
U.S. Cl. 30—180 **8 Claims**

1. A compressed gas operated power handle for use with tools having pivotally interconnected lever arms with forward extending distal jaw portions and proximal actuating portions comprising:

A. A pair of opposing sidewalls rigidly spaced apart;
B. A pair of inflatable bellows, each positioned between one of said sidewalls and the proximal portion of one lever arm of said tool;
C. A transversely expandable member attached to and between said lever arms; and



D. A manually operated inflation valve alternatively connecting said bellows to atmosphere when said valve is not actuated and connecting said bellows for inflation to a source of compressed gas when said valve is actuated, whereby the lever arms of said tool are pivotally juxtaposed when said bellows inflate and are pivotally separated when said bellows deflate.

3,888,004

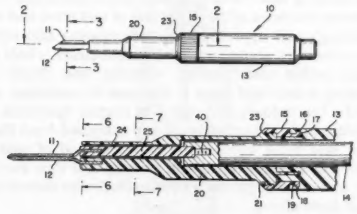
ULTRASONSICALLY VIBRATED SURGICAL CUTTING INSTRUMENT

Donald Jackson Coleman, 223 Maple St., Haworth, N.J. 07641

Continuation-in-part of Ser. No. 386,867, Aug. 9, 1973, abandoned. This application Sept. 20, 1974, Ser. No. 507,978

Int. Cl. B26b *7/00*

U.S. Cl. 30—272 A **4 Claims**



1. An improved ultrasonically vibrated surgical cutting instrument having an ultrasonic frequency generator, a transducer in communication with said ultrasonic frequency generator for converting ultrasonic energy to vibratory energy and a vibrating anvil in communication with said transducer for providing vibrations wherein the improvement comprises a fixed knife blade, a moveable knife blade in communication with said fixed knife blade and said vibrating anvil and means for preventing said moveable knife blade from separating from said fixed knife blade during the cutting operation so that said fixed knife blade prevents said moveable knife blade from deflecting during the cutting operation.

3,888,005

CUTTING TOOL

Dennis P. Bagwell, La Grange, Ill., assignor to Tomorrow Enterprises, Inc., La Grange, Ill.

Continuation-in-part of Ser. No. 443,603, Feb. 19, 1974, abandoned, which is a continuation of Ser. No. 274,642, July 24, 1972, abandoned. This application Sept. 3, 1974, Ser. No. 502,341

Int. Cl. B26b *9/02, 29/02*

U.S. Cl. 30—286 **6 Claims**

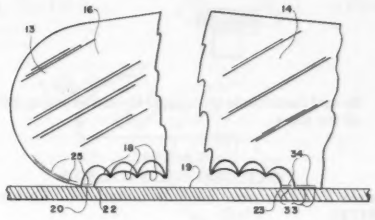
1. A knife comprising

a handle,

a blade attached to the handle and having a blunt top edge and opposite thereto a continuous cutting edge, and

damage preventing tips at both ends of the cutting edge which in normal use at a cutting angle of 0° contacts a flat support surface on which an article being cut rests, said cutting edge at 0° being essentially flush against the support surface so that the article being cut is severed clean through,

each of said tips including a smooth, wide-area contact surface which is essentially flush against the support surface at the cutting angle of 0°, and a junction point



common to the cutting edge and the contact surface so that at said 0° cutting angle the junction point moves through the article, severing said article while remaining flush with the support surface but not striking into said support surface, thereby avoiding cutting or abrading said surface,

the contact surfaces of both said tips having smooth, rounded edge extremities such that a twisting motion about the longitudinal axis of the knife blade during cutting will bring the rounded edge extremities into contact with the support surface, whereby said rounded edges are adapted to avoid scratching, abrading or cutting of said support surface.

3,888,006

CLIPPING DEVICE FOR FRUIT STEMS AND THE LIKE

Allen C. Roberts, Rockledge, Indian Cave, Guilford, Conn. 06437

Filed Oct. 21, 1974, Ser. No. 516,423

Int. Cl. B26b *27/00*

U.S. Cl. 30—298 **6 Claims**

1. A device for clipping the stems of fruit and the like comprising:

a. a pair of longitudinally extending arms pivotally connected together at one end portion for relative generally laterally swinging movement toward and away from each other, intermediate portions and end portions of said arms opposite said pivotal connection being spaced laterally from each other in all swinging positions thereof,

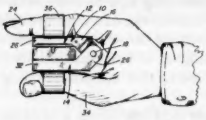
b. a laterally outwardly projecting member on each of said arms which members are at least partially circular viewed longitudinally and which are adapted respectively to receive a thumb and forefinger of an operator's hand for manual manipulation, the pivotally connected end portions of the arms being positioned between thumb and forefinger base portions,

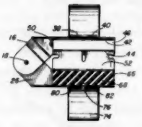
c. a single edge razor blade,

d. one of said arms having a laterally inwardly open slot for receiving and frictionally holding a body portion of said single edge razor blade, the blade portion of the razor blade projecting laterally inwardly therefrom toward the other arm for manual clipping operation of a stem on inward swinging of the arms,

e. and an elongated resilient backup member removably

mounted on and along an inner portion of said other arm for engaging and supporting a stem as the latter is severed





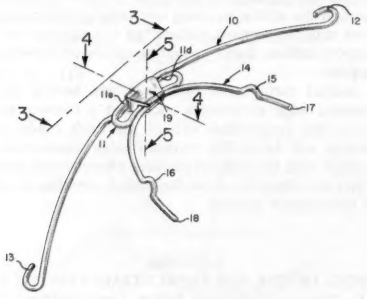
by said razor blade on manual inward swinging movement of the arms.

3,888,007

ORTHODONTIC FACE BOW

Donald F. Chittenden, 1365 N. Armel Dr., Covina, Calif. 91722

Filed Apr. 18, 1974, Ser. No. 461,855
Int. Cl. A61c *7/00*
U.S. Cl. 32—14 D **7 Claims**



1. An orthopedic face bow comprising, in combination:
a. an outer bow member defined forming an elongated loop at its central portion;
b. an inner bow having its central portion secured to a central underside portion of said elongated loop; and,
c. a rigid centerpiece having a lower channel with a floor portion passing through said elongated loop, the central portion of the inner bow and lower central portion of the loop lying in said channel so that the lower side walls eclipse the securement portion of the inner bow to the outer bow the upper surface of said center piece defining the opposite side of the floor of said lower channel, including portions servicing as fulcrum surfaces when the extending ends of the outer bow are flexed inwardly.

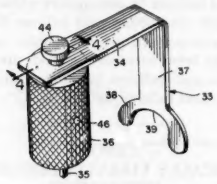
3,888,008

HANDPIECE AND CHUCK WRENCH THEREFOR

Charles C. Lake, Park Ridge, and Boubene M. Jaremus, Barrington, both of Ill., assignors to American Hospital Supply Corporation, Evanston, Ill.

Filed Jan. 24, 1973, Ser. No. 326,569
Int. Cl. A61c *1/10*
U.S. Cl. 32—27 **46 Claims**

1. A dental handpiece combination comprising a rotor housing having a chamber and having upper and lower openings coaxial therewith, a rotor within said chamber having a bore aligned with said openings and being adapted to be driven in a clockwise direction when viewed from above during normal handpiece operation, said bore having outwardly flared surfaces at its lower end, a collet chuck received within said bore and having a plurality of spring jaws at its lower end for releasably holding a dental bur, said jaws being externally enlarged at their lower ends to provide bearing surfaces engageable with the flared surfaces of said bore, said chuck and said rotor being threadedly connected within said bore by right-hand threads which direct said chuck upwardly to force said jaws into camming engagement with said flared surfaces when said chuck is urged in a counterclockwise direction relative to said rotor, means provided at the upper end of said



chuck and accessible through the upper opening of said housing for holding said chuck against rotation within said housing, and means provided at the upper end of said rotor and accessible through said upper opening for engaging said rotor and turning the same about its axis while said chuck is held against rotation within said housing, whereby, said chuck is self-tightening within said rotor in response to resistance exerted against a bur held by said chuck in normal operation of said handpiece and may be loosened and extracted from the lower end of said rotor by holding the upper end of said chuck against rotation relative to said housing and then turning the upper end of said rotor in a counterclockwise direction when viewed from above.

3,888,009

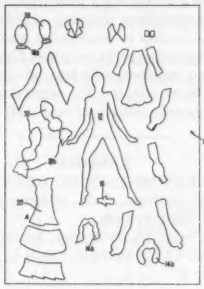
EQUIPMENT FOR DESIGNING AND MAKING COSTUMES

Berta A. I. White, Cambridge, and William G. Lines, Godstone, both of England, assignors to Kincob Limited, Cambridge, England

Filed July 11, 1973, Ser. No. 378,173
Claims priority, application United Kingdom, July 19, 1972, 33786/72
Int. Cl. A41h *43/00*
U.S. Cl. 33—12 **9 Claims**

1. A kit for use in designing and making costumes, comprising, in combination, a set of stencils with each stencil having a unique outline representing a particular costume part, at least one of said costume parts being represented by the outline of more than one shape of a particular style, at least one clothing pattern piece representing each stencil outline, with corresponding ones of the stencil outlines and pattern pieces having similar markings as an aid to matching, whereby a costume can be designed by selecting a particular combination of outlines and drawing through said outlines onto a writing sheet to form a two-dimensional representation of a design, and that particular costume design can be constructed

by using said similar markings to locate the pattern pieces which correspond to the outlines used in the costume design



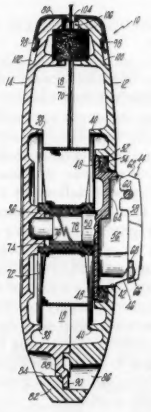
and then using those pattern pieces to cut the material and make the costume.

3,888,010

CHALK LINE DEVICE

Robert Steven Hyde, East Hartford, and Maarten Cornelis De Jong, Canton, both of Conn., assignors to The Stanley Works, New Britain, Conn.

Filed Dec. 10, 1973, Ser. No. 423,079
Int. Cl. B44d *3/38*
U.S. Cl. 33—87 **5 Claims**



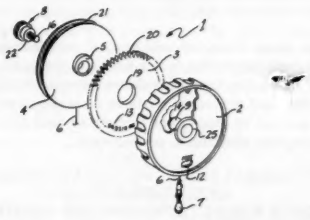
1. A chalk line dispensing and storage device comprising a casing of plumbbob configuration having an aperture in the top thereof, said casing including a pair of mating side members defining a chalk chamber and having longitudinally extending mating surfaces, a chalk line reel rotatably mounted in said chalk chamber, a chalk line mounted on the reel and extending from the chamber through said top aperture, said side members being interconnected by a releasable pivot including a shouldered recess in one of said members adjacent said mating surface and a depending flange in the other of said side members pivotably receivable within the recess for engagement with the shoulder, a mountable resilient clamp bridging said side members at a position remote from said releasable pivot and interconnected therewith to retain the mating surfaces in intimate engagement and prevent separation thereof, a compressible seal and a crank assembly mounted on one of said side members for engagement with said seal, said crank assembly including a drive shaft mounting the reel for rotation therewith, said casing side members axially biasing said crank assembly into frictional engagement with said seal to prevent free wheeling rotation of said reel while sealing the chalk chamber at said crank assembly.

3,888,011

MEASURING DEVICES AND METHODS OF MAKING AND USING THE SAME

Loran D. Hunt, Jr., 7493 Hazelcrest Dr., Hazelwood, Mo. 63043

Filed Oct. 12, 1973, Ser. No. 405,776
Int. Cl. G01b *3/00;* **G01f** *23/04;* **F16h** *1/28*
U.S. Cl. 33—126.5 **4 Claims**



1. A measuring device comprising,
housing means, said housing means provided with a chamber therein,
a pair of sprocket teeth operably mounted in said chamber, a first hub means operably mounted on said housing means, said first hub means disposed within said chamber, reel means rotatably mounted on said first hub means, measuring line means operably secured to said reel means, second hub means mounted on said reel means, said second hub means disposed eccentric to the axis of rotation of said reel means sprocket means rotatably mounted on said second hub means and communicating with said sprocket teeth,
securing means operably coupling said reel means to said housing means, sprocket means being provided with measuring indicia and said housing being provided with an indicia viewing port, through which said indicia are visible.

3,888,012

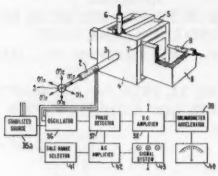
INSTRUMENT FOR THE SIMULTANEOUS TRANSMISSION OF THE MOVEMENTS OF A FEELER TO AT LEAST TWO READING MEANS

René Droz, Le Locle, Switzerland, assignor to Les Fabriques d'Assortiments Reunies, Le Locle, Switzerland

Filed Feb. 22, 1972, Ser. No. 228,215
Claims priority, application Switzerland, Mar. 1, 1971, 2976/71
Int. Cl. G01b *5/25*
U.S. Cl. 33—174 L **5 Claims**

1. An instrument for the simultaneous transmission of the movements of a feeler with respect to at least two orthogonal coordinate axes to at least two reading means, each of them having a moveable portion and a sensor responding to displacements of the said moveable portion, said instrument comprising a frame, two parallelogram assemblies combined together between said frame and the feeler, each of said parallelogram assemblies having two elastically deformable sides parallel to each other and two other sides perpendicular to said deformable sides forming rigid bridges parallel to each other and interconnecting said deformable sides, said rigid bridges being maintained parallel by said deformable sides during deformation; one of said bridges of a first one of said

parallelogram assemblies being ridigly connected with said frame and the other bridge of said first parallelogram assembly being rigidly connected to one of the bridges of the second of said parallelogram assemblies with said second assembly disposed within the bounds of the four sides of said first assembly, the other bridge of said second parallelogram assembly being connected to the feeler whereby the same is moveable in at least two degrees of freedom characterized by the coordinate axes, said moveable portions of said two reading means being carried by said other bridges of said first and second parallelogram assemblies, respectively.

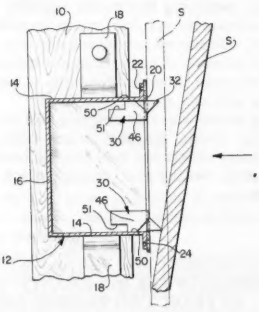


3,888,013

DEVICE FOR DETERMINING THE POSITION AND OUTLINE OF OPENINGS TO BE MADE IN SHEET MATERIALS

Lucien E. Benoit, R.F.D. 2, Woonsocket, R.I. 02864

Filed July 10, 1974, Ser. No. 487,229
Int. Cl. B25h *7/04;* **G01b** *3/14*
U.S. Cl. 33—174 G **5 Claims**



1. A template or the like for determining the position and outline of openings to be made in sheet material to receive wall boxes open on one side thereof such as electrical outlet boxes prior to the use of such sheet material in a subsequent finish wall construction comprising,

a generally flat frame member having a peripheral configuration corresponding to the particular opening desired in said sheet material, said frame member having portions thereof adapted for contact with the outer edges of said open one side of such wall box, said frame member further having a plurality of connected walls each having inner and outer sides thereof,

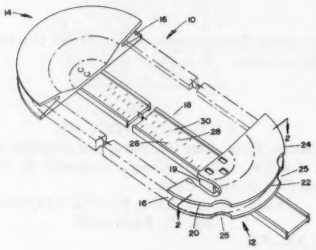
means for temporarily supporting said member in a generally superimposed position over said open one side of said wall box, said means comprising a plurality of legs downwardly dependent from said member, each of said legs being attached to an inner side portion of said walls, attachment means on the upper surface of said member for directly temporarily attaching said template to said sheet material in the position corresponding to that of the underlying wall box in said finish wall construction when said sheet material is forced thereagainst and subsequently removed therefrom, and wherein said frame member is of a plural angle geometric configuration, said wall box comprising a plurality of sidewalls disposed in angular relationship to each other and exhibiting a geometric configuration at its open end corresponding to that of said frame member, said legs having first and second bearing surfaces adapted for engaging contact with respective adjacent surfaces of said wall box sidewalls.

3,888,014

BELT MEASURING DEVICE

William L. Bixler, Littleton, Colo., assignor to The Gates Rubber Company, Denver, Colo.

Filed Mar. 25, 1974, Ser. No. 454,995
Int. Cl. G01b *3/00;* **G01d** *21/02*
U.S. Cl. 33—174 R **6 Claims**



1. A gauge for identifying V-belts of various top widths and lengths comprising:

a first generally semi-sheave member having a V-groove defined by two oppositely oriented faces;

a stick fixedly attached near one end to said first member, the stick having its length identifying characters;

a second generally semi-sheave member attached to said stick for reciprocal movement toward and away from the first semi-sheave member, the second semi-sheave member having a V-groove defined by two oppositely oriented faces, the first and second semi-sheave members arranged to have their V-grooves oppositely facing away from each other adapted for receiving a V-Belt and dividing it into two curved portions and two straight portions;

means for gauging the top width of a V-belt comprising at least one of said oppositely oriented faces with at least one variable arcuate outer peripheral portion defined by a generally constantly increasing face radius that effects generally a constantly increasing arcuate V-groove portion of increasing width juxtaposed thereto to define a variable gauging portion;

means in cooperation with the variable gauging portion for pointing to the belt identifying characters.

3,888,015

PRESETTING FIXTURE FOR CAM ACTUATED TURRET LATHES

Raymond H. Williams, P.O. Box 280, Chadwicks, N.Y. 13319

Filed Mar. 11, 1974, Ser. No. 449,858
Int. Cl. B27g *23/00*
U.S. Cl. 33—185 R **3 Claims**

1. A presetting fixture for a cam actuated turret lathe including:

a rigid base having a guideway;

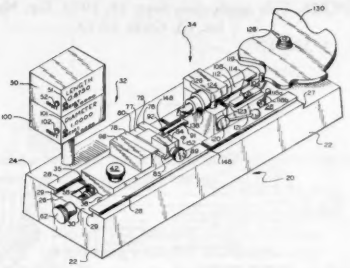
a support member on the base on which a turret cam, to be used for presetting, can be mounted;

a first and a second slide each independently movable in the guideway;

turret-collet simulating means including retaining means on the first slide in which a turret tool holder can be held and reference means on the second slide for representing axial positions on a workpiece held by a collet;

a cam follower on either of said slides to permit said slide to be positioned by the lobes of the turret cam mounted on the support member;

measuring means on the other slide for determining its position relative to the slide with the cam follower; and



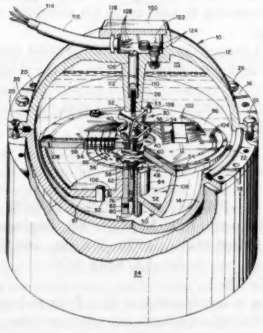
diameter reference means operably connected to the second slide for positioning a tool off center within the turret tool holder, the diameter reference means including a diameter guideway in the second slide running perpendicular to the base guideway, a diameter slide movable in said diameter guideway, and diameter measuring means for determining the position of the diameter slide within its guideway.

3,888,016

DIGITAL COMPASS

John T. Fowler, Winthrop, Mass., assignor to Arthur D. Little, Inc., Cambridge, Mass.

Filed Aug. 10, 1972, Ser. No. 279,723
Int. Cl. G01c *17/26*
U.S. Cl. 33—346 **15 Claims**



1. A digital compass comprising:

a housing containing a damping liquid therein and including:

first and second circumferentially flanged hemispherical portions secured together in sealing relationship; and

a support member depending internally from the first hemispherical portion, said member having a sealable liquid port therein through which damping liquid may be introduced to and sealed inside the housing;

a gimbal assembly supported within the housing by said support member and including:

a bracket affixed to said support member;

a first gimbal attached to the bracket for rotation about a first axis;

a second gimbal attached to the first gimbal for rotation about a second axis orthogonal to the first axis;

an enclosure filled with a damping liquid in fluid communication with the housing liquid and pendulously supported by the second gimbal for rotation about said first and second orthogonal axes;

a shaft disposed in said enclosure and rotatably mounted to the second gimbal and the enclosure for rotation about a third axis orthogonal to said first and second axes;

a compass rotor affixed to said shaft within said enclosure and having a sensible code thereon representative of compass headings;

a cylindrical magnet affixed within said enclosure to said shaft and compass rotor and rotatable therewith to align the compass rotor with respect to the earth's magnetic field; and

means in said enclosure for sensing the code on the compass rotor and to provide an output signal representative of compass heading.

3,888,017

METHOD FOR PREPARATION OF FINE PARTICLE SIZE INORGANIC OXIDIZERS

David A. McBride, Cumberland, Md., assignor to Hercules Incorporated, Wilmington, Del.

Filed Mar. 25, 1974, Ser. No. 454,625
Int. Cl. F26b *5/06, 5/08*
U.S. Cl. 34—5 **12 Claims**

1. A process for preparation of fine particle size inorganic oxidizers comprising:

a. forming an aqueous solution of an inorganic oxidizer selected from the group consisting of ammonium perchlorate, sodium perchlorate, potassium perchlorate, ammonium nitrate, sodium nitrate and potassium nitrate,

b. centrifugally dispersing said solution into a spray of fine droplets having a high radial velocity,

c. forming a film of quenching liquid, said quenching liquid being a nonsolvent for the inorganic oxidizer in solution, said quenching liquid being at a temperature at which crystallization of the fine droplets of inorganic oxidizer solution will occur substantially instantaneously upon penetration of said film by said droplets,

d. impinging the fine droplets of step (b) on the film of quenching liquid at a velocity sufficient for the droplets to penetrate the surface of the quenching liquid whereby the inorganic oxidizer crystallizes from said droplets forming fine inorganic oxidizer particles,

e. subliming water and quenching liquid from the crystallized inorganic oxidizer particles, and

f. recovering inorganic oxidizers having a weight medium diameter of less than about one micron.

3,888,018

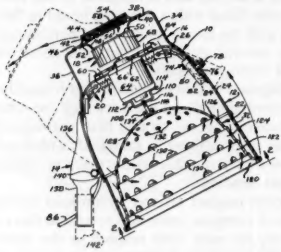
HAIR DRYER

John Wayne Gaski, Jr., River Grove, Ill., assignor to DeGraff Products Company, Chicago, Ill.

Filed May 10, 1974, Ser. No. 468,822
Int. Cl. A45d *20/25*
U.S. Cl. 34—99 **7 Claims**

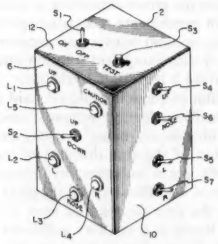
1. In a hair dryer assembly having a support, the improvement being a hair dryer mounted on the support, said hair dryer comprising: a housing connected to said support, said housing having a hollow main body, a support collar formed integral with one end of the main body, said collar having a plurality of air ports extending therethrough, a dome-shaped hood diffuser releasably and sealingly connected to said main body, said diffuser being adapted to receive a person's head, said diffuser having a plurality of exit ports to allow air to flow

from the main body into the diffuser, an inlet housing mounted on the end of the main body adjacent to the collar, said inlet housing having an inlet aperture, a filter mounted in the inlet aperture to filter air entering the inlet housing, an air impeller rotatable about an axis positioned in the inlet housing



to draw air into the inlet housing through the inlet aperture, an electric motor driving the air impeller, a heating element mounted in said main body for heating air passing through the air ports in the collar, and means for controlling the heating element connected to the heating element.

3,888,019
LANDING GEAR POSITION SIMULATOR
Humberto Trabanino, 318 Vagabond Dr., Murray, Utah 84107
Filed Apr. 24, 1974, Ser. No. 463,434
Int. Cl. G09b 9/08
U.S. Cl. 35—12 B **4 Claims**



4. A landing gear position simulator for use in an aircraft capable of seating a student pilot and an instructor and including apparatus for generating an indication of the aircraft speed comprising

first and second panels positioned in different planes, said simulator being positioned in the aircraft so that the student pilot may view the first panel and the instructor may view the second panel,

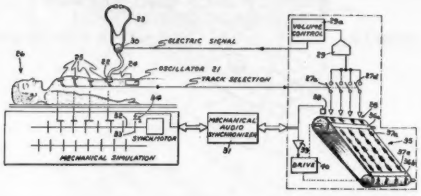
first, said second and third indicators, when activated, representing that left and right landing gear respectively of the aircraft are in the extended position, and said first indicator, when activated, representing that the landing gear are in the retracted position,

a manually operable landing gear control simulation switch mounted on said first panel, wherein movement of said switch to a first position simulates a control action to retract the landing gear and movement of said switch to a second position simulates a control action to extend the landing gear,

first, second and third manually operable switches mounted on said second panel for selectively preventing the activation of said first, second and third visual indicators respectively, and

a fourth visual indicator mounted on said first panel, and means responsive to an aircraft speed indication for activating said fourth visual indicator if said simulation switch is in the first position.

3,888,020
MANIKIN SYNCHRONIZATION SYSTEM
Irving A. Krause, Nutley, N.J., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.
Division of Ser. No. 221,902, Jan. 31, 1972, Pat. No. 3,769,526. This application Sept. 18, 1973, Ser. No. 398,357
Int. Cl. G09b 23/32
U.S. Cl. 35—17 **2 Claims**



1. A manikin arrangement comprising:

means for providing an indication of a mechanical motion cycle of said manikin;

means for selectively producing one of a plurality of audio sounds;

means for producing an indication of a selected audio cycle; and

means for synchronizing the selected audio cycle with said mechanical motion cycle, further comprising

a. first means for producing a ramp function voltage representing said mechanical motion cycle including a relay having its contacts momentarily closed according to said cycle,

b. second means coupled to said first means for storing and sampling said ramp voltage in response to said audio cycle including a second relay having its contacts momentarily closed according to said cycle for sampling said ramp voltage,

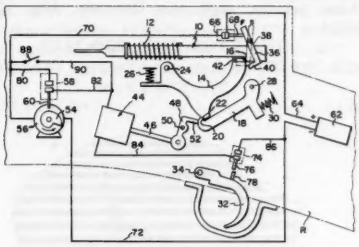
c. third means coupled to said second means to provide a voltage output proportional to the stored voltage, and

d. Fourth means coupled to said third means to effect a synchronization between said mechanical and audio cycles.

3,888,021
FIRING CONTROL SYSTEM
James P. McCurdy, 1025 N. Miller Rd., Saginaw, Mich. 48603
Filed May 6, 1974, Ser. No. 466,991
Int. Cl. F41g 3/26
U.S. Cl. 35—25 **4 Claims**

1. For use in combination with a firearm having a firing pin movable between a cocked and a fire position, a trigger movable between a ready and a fire position, and a safety movable between a safe and a fire position, the improvement comprising firing control means including latch means normally engaged with said firing pin when said pin is in said cocked position to latch said pin in said cocked position and operable when actuated to release said pin to permit said pin to move to said fire position; cyclically movable means operable at one point in its cycle to condition said latch means for actuation; drive means operable when actuated to drive said cyclically movable means in cyclic movement; first control means for

actuating said drive means; and second control means operable when said trigger is in said fire position to actuate said



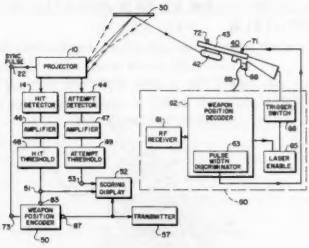
latch means when said latch means is conditioned for actuation by said cyclically movable means.

3,888,022

MOVING TARGET SCREEN

Herman I. Pardes, Wanamassa; Joseph R. Schwartz, Neptune City, and Frederick B. Sherburne, Oceanport, all of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 4, 1974, Ser. No. 476,238
Int. Cl. F41g *11/00*
U.S. Cl. 35—25 **8 Claims**



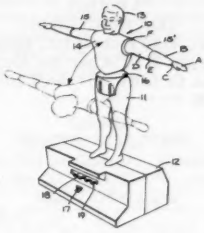
1. An electro-optical weapon firing training device comprising a film strip projector and viewing screen, at least one weapon on which is mounted a laser means to trigger a laser beam upon firing said weapon, a film strip, each frame of said film strip containing a first portion representing a scene including at least one target area at which the laser beam should be directed and a second portion which is substantially opaque to radiation from said laser except for at least one aperture region through which light from said projector can pass, the location of said aperture within said second portion being in the same relative position as the location of the target area in the first portion of said film strip, said projector including optical means for projecting each frame of said film strip onto said screen as two separate projected frame portions each having a scene portion and a bright spot whose location relative to the projected scene portion is the same as that of the aperture region relative to the first portion of said film frame, and including adjustable means for initially moving one projected frame portion on the screen relative to the other projected frame portion on the screen until the aperture region in the second projected frame portion is superimposed exactly on the corresponding target area in the scene portion of the other projected frame portion, and means responsive to correspondence between the position of the laser beam impingement upon said screen and said bright spot.

3,888,023

PHYSICAL TRAINING ROBOT

Robert Genin, Bay Harbor Islands, Fla., assignor to Jardine Industries, Inc., Hong Kong

Filed Aug. 21, 1974, Ser. No. 499,194
Int. Cl. G09b *19/00*; **A63h** *11/00*
U.S. Cl. 35—29 R **9 Claims**



1. A physical training robot arrangement adapted to demonstrate any one of a series of calisthenic movements, said arrangement comprising:

A. a robot having a humanoid form including a torso element having hand and arm assemblies attached to the shoulders thereof, said torso element being mounted above a pelvis element and being rockable from side to side and being oscillatable back and forth with respect to said torso element, said pelvis element being trunnioned on top of a pair of legs whereby the pelvis element may be caused to bend forwardly to execute a bowing movement of the robot; and

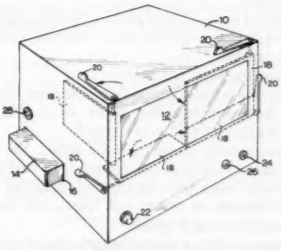
B. a motorized mechanism operatively coupled to said torso and pelvis elements selectively to effect rocking, oscillating and bowing movements thereof.

3,888,024

AUDIO-VISUAL TEACHING APPARATUS

John Kenneth Elliott, 82 Baybrook Cres., Scarborough, Ontario, Canada

Filed Aug. 9, 1973, Ser. No. 386,981
Int. Cl. G09b *17/00*
U.S. Cl. 35—35 R **8 Claims**



1. An apparatus for teaching a person how to communicate with other persons comprising:

means for simultaneously visually displaying at least four sequences of images which relate to communication among persons and which are different visual representations of identical subject matter, said display of sequences being uninterrupted and

means selectively operable for optionally precluding visual display of at least one of said sequences of images to the person being taught;

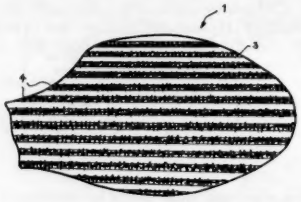
at least two of said sequences being a series of pictorial representations of the subject matter being taught and the

remaining sequences being word sequences representing the same subject matter, the presentation of said at least four sequences being the simultaneous display of a word or a group of words of said word sequences which corresponds with the pictorial representations being then displayed.

3,888,025
TEACHING GAME
Drucilla Schmieder, 4180 Pontatoc Rd., Tucson, Ariz. 85718
Filed Jan. 9, 1974, Ser. No. 431,956
Int. Cl. G09b *5/04*; A63f *9/10*
U.S. Cl. 35—35 H **7 Claims**

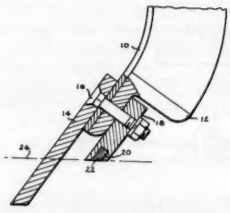
1. A teaching game method for learning Spanish by a student comprising the steps:
a. providing a tape recording in English stating the object of the game and the procedure to be followed by the student;
b. providing a series of whistle signals on the tape at spaced intervals;
c. providing a game board containing a plurality of recessed windows;
d. providing a plurality of picture puzzles, each puzzle comprising five pieces, each piece carrying a part of a picture of an animal;
e. starting the tape recording;
f. at the first whistle signal from the tape recording beginning the assembly of the first of said picture puzzles in the first window of said game board;
g. simultaneously at said whistle signal, the name, sound, and color of the animal is recited from said tape recording in Spanish such that the student identifies the pieces for each window in order and learns the lesson with the placement of each piece;
h. the tape renders a second whistle signal which terminates the time interval for the assembly of the five pieces in the first window;
i. said second whistle signal starting the time interval for the assembly of the five pieces in the second window while the name, color, and sound of the animal is recited in Spanish;
j. the tape renders a third whistle signal starting the assembly of a set of five pieces in the third window, the operation continuing in like manner until all of the windows have been worked in turn without stopping the tape, and;
k. the tape being rewound and replayed in its entirety until each set of five pieces can be assembled in each respective window in twenty-five seconds.

3,888,026
RUNNING SOLE FOR SPORTS SHOE
Adolf Dassler, D-8522 Herzogenaurach am Bahnhof, Germany
Filed Aug. 2, 1973, Ser. No. 384,813
Claims priority, application Germany, Aug. 12, 1972, 2239824
Int. Cl. D04h *11/00*; B32b *31/00*
U.S. Cl. 36—25 R **15 Claims**



1. A running sole for a sports shoe comprising a carrier, fiber bristles distributed at least over certain areas of said carrier and extending downwardly therefrom, and a synthetic resin impregnation stiffening and gluing said fiber bristles to one another.

3,888,027
ARRANGEMENT FOR ENHANCING BLADE LIFE
Leonard F. Toews, Greensburg, Pa., assignor to Kennametal Inc., Latrobe, Pa.
Continuation of Ser. No. 384,024, July 30, 1973. This application Sept. 12, 1974, Ser. No. 505,471
Int. Cl. E02f *9/28*
U.S. Cl. 37—141 R **10 Claims**

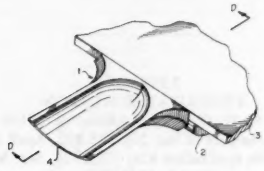


1. Wear resistant means for use in combination with an elongated steel blade for a grader or snow plow, the blade in unworn condition having parallel upper and lower edges and including means near the upper edge for fixedly supporting the blade with the lower edge exposed, said wear resistant means adapted to be disposed parallel to and rearwardly of the blade near at least one end thereof, said wear resistant means including at least one member having upper and lower edges and being substantially more narrow in the vertical direction than the blade, said member in length being a small fraction only of the total length of the blade, means near the upper edge of said member for fixedly supporting the member parallel to the blade near the end of the blade and rearwardly thereof and with the said lower edge of the member spaced upwardly from the lower edge of the blade and parallel thereto, the distance between the lower edge of the said member and the lower edge of the blade when the latter is not worn being about equal to maximum amount to be worn off the blade before replacement thereof, the lower edge of said member including wear and abrasion resistant means substantially more wear and abrasion resistant than the steel of the blade.

3,888,028
DIGGER TOOTH

Kenneth M. White, Calgary, Alberta, Canada, assignor to Western Rock Bit Company Limited, Calgary, Alberta, Canada

Continuation of Ser. No. 373,939, June 27, 1973, abandoned.
This application Sept. 10, 1974, Ser. No. 504,697
Claims priority, application Canada, May 29, 1973, 172630
Int. Cl. E02f *9/28*
U.S. Cl. 37—142 R **7 Claims**

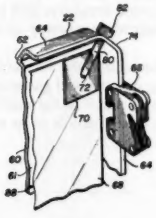


1. A digger tooth for releasable attachment to an excavating machine, comprising a mounting portion and a cutting portion having a cutting edge, said cutting portion having an upper concave and a lower convex surface as viewed in transverse section, said surfaces varying in profile such that the outer edges of the cutting portion are thicker than its central part, whereby when said tooth is mounted and working said outer edges undercut a portion of material on each side of the material to be removed.

3,888,029
CHANGEABLE MULTIPLE IMAGE DISPLAY APPARATUS

Wilfried Schubert, Bensenville, Ill., assignor to National Advertising Company, Bedford Park, Ill.

Division of Ser. No. 294,791, Oct. 4, 1972, Pat. No. 3,824,726.
This application Feb. 1, 1974, Ser. No. 438,742
Int. Cl. G09f *13/04*
U.S. Cl. 40—125 G **8 Claims**

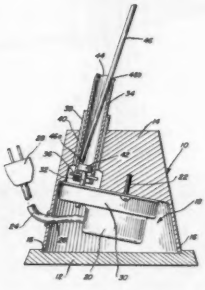


1. A removable display film carrier for changeable copyboards comprising:
- a carrier frame having a display face bounded by side flanges extending from said carrier frame transversely to said display face and including means for removably attaching said carrier frame to said copyboard;
- said side flanges having mounting apertures therein;
- a thin, flexible film sheet bearing a display image and including a plurality of apertures along the perimeter thereof; and
- a plurality of tensioning members for suspendingly mounting said film sheet in substantially constant tension on said carrier frame with said display image viewable through said display face;
- each of said tensioning members including;
- an elongated, elastomeric middle portion,
- a tail knob at one end of said middle portion, said tail knob having a slightly larger cross sectional portion than said middle portion;
- a head knob at the other end of said middle portion, said head knob having a slightly larger cross sectional portion than said middle portion;
- each of said tensioning members engageable between respective mounting apertures in said side flanges and said film sheet perimeter with said tail knob engaging said side flange, said head knob engaging said film sheet, and said middle portion in elastic tension therebetween for suspending said film sheet in substantially constant tension between said side flanges.

3,888,030
KINETIC SCULPTURE

Gordon E. Bradt, 828 Ashland Ave., Wilmette, Ill. 60091

Filed Jan. 21, 1974, Ser. No. 434,861
Int. Cl. G09f *19/02*
U.S. Cl. 40—126 R **14 Claims**



1. A kinetic sculpture, comprising:
- a base structure adapted for positioning on a support structure such as a table top or the like;
- motive means mounted on said base structure;
- motion imparting means mounted on said base structure and operatively associated with said motive means to be driven thereby, said motion imparting means including means providing an elongated cavity having a substantially non-circular open top and a substantially closed bottom and being rotatable by said motive means about an axis extending generally longitudinally of said cavity; and
- at least one elongated flexible rod-like member of a cross sectional size less than the inner cross dimensions of said cavity, said rod member being positioned at one end into said cavity so as to be freely movable therein whereby swinging, bobbing, swaying and other movements may be imparted to said rod member in response to rotation of said motion imparting means depending on the cross sectional shape of said cavity.

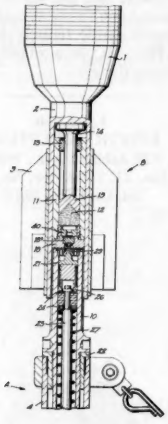
3,888,031
BALLISTIC SET INCLUDING A PROJECTILE AND ITS LAUNCHING DEVICE

Robert M. Bornand, Meyrin, Switzerland, assignor to Valinor Anstalt, Vaduz, Liechtenstein

Filed Oct. 16, 1973, Ser. No. 406,929
Claims priority, application Switzerland, Oct. 5, 1973, 14240/73
Int. Cl. F41c *27/06*
U.S. Cl. 42—1 F **4 Claims**

1. In a ballistic device comprising a projectile and a launcher for said projectile, the projectile comprising a rearwardly extending tube containing a combustion chamber which in turn contains a combustible launching charge sealed

in the chamber by means of a piston at the forward side of the charge, the launcher comprising a guiding tip that extends forwardly into the tube, the piston bearing at its forward side on a rod that propels the projectile, and ignition means for the launching charge; the improvement in which said ignition means comprises a floating lifter disposed in said guide tip and a floating striker disposed in said projectile at the rear of said



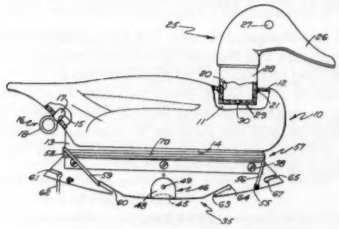
combustion chamber, there being a firing primer between said striker and said combustion charge, a guide rod reciprocable in said guide tip, and spring means urging said guide rod toward said floating lifter whereby upon movement of said guide rod toward said floating lifter under the influence of said spring means, said floating lifter strikes said floating striker which in turn strikes said primer to ignite said combustion charge.

3,888,032

WATERFOWL DECOY

Kenneth M. Gagnon, 302 Reservoir Ave., Lincoln, R.I. 02865

Filed Apr. 12, 1974, Ser. No. 460,295
Int. Cl. A01m *31/06*
U.S. Cl. 43—3 **6 Claims**



1. A waterfowl decoy comprising

a. a hollow body portion having an outer shell of resilient material with an opening in said shell,

b. said body portion being provided with a fin integral therewith,

c. a detachable keel having means to detachably secure said keel to said fin, said detachable keel having wedge-shape slots extending inwardly from the outer periphery thereof to wedge an anchoring cord therein, said slots being oppositely oriented to present a web portion about which the anchoring cord may be wound,

d. a head portion having a neck extending downwardly therefrom, said neck being substantially cylindrical and of a size to have an interference fit throughout its length with said opening and with its outer surface smooth and parallel with its center axis whereby said neck may be axially adjusted through said opening to a number of positions,

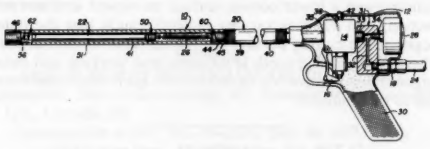
e. said hollow body portion being molded from a collapsible resilient material which permits the body to be collapsed and to return to its working position after the collapsing influence is removed.

3,888,033

UNDERWATER WEAPON

Raoul Fima, 655 W. Diversey, Addison, Ill. 60101

Continuation-in-part of Ser. No. 245,832, April 20, 1972, abandoned. This application May 17, 1974, Ser. No. 471,010
Int. Cl. A01k *81/04*
U.S. Cl. 43—6 **8 Claims**



1. An underwater weapon of the type including a hollow tip member connected to a piston which is forwardly driven from a retracted position in a cylinder by compressed gas to project the tip therefrom into a creature, said gas being injected into the creature through a passageway in said tip, the improvement comprising

bypass means disposed in the forward portion of said cylinder for feeding compressed gas around said piston to the passageway in said hollow tip said bypass means operating only when said piston is in its most forward position.

3,888,034

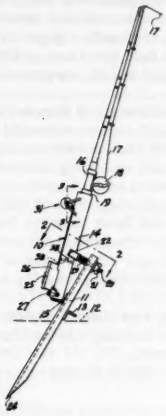
ADJUSTABLE FISHING POLE HOLDER

Kenneth H. McGuire, 5010 Sorento Rd., Sacramento, Calif. 95835

Filed Nov. 20, 1973, Ser. No. 417,518
Int. Cl. A01k *97/12*
U.S. Cl. 43—17 **3 Claims**

1. An adjustable fishing pole holder and signal comprising a stake for insertion in the earth, a tubular support hingedly secured to said stake and adapted to receive the lower end of a fishing pole, a securing element resiliently mounted on said stake and engaging said support for maintaining said support in a generally upright position, a control unit, means mounting said unit to said support for rotary adjustment about a generally horizontal axis transverse to said support, a pair of mercury switches mounted in said unit extending perpendicularly to the axis of said unit and spaced respectively above and

below the axis of said unit, signal means on said support and means connecting said mercury switches to said signal means

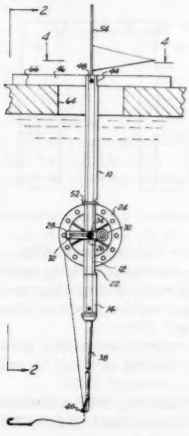


for actuating said signal means on movement of said support and said switches.

3,888,035
ICE FISHING ROD

Ralph P. Totten, 7455 Parkstone Ln., Birmingham, Mich. 48010, and Gerald F. Lewis, 1850 Columbia, Berkley, Mich. 48072

Filed Mar. 18, 1974, Ser. No. 451,948
Int. Cl. A01k *97/12*
U.S. Cl. 43—17 **8 Claims**

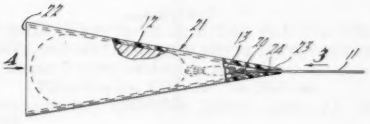


1. An elongated ice fishing rod having a handle section at one end which is channel shaped in cross-section; a line guide section at the opposite end; a reel retaining section between the handle section and the line guide section; and an elongated support section having its midpoint pivotably supported to the free end of the handle section so that it may be disposed in a first position wherein it partially lies within said channel section and forms a coaxial extension of said handle or a second position wherein it projects normally relative to said handle section and is adapted to lie across a hole formed in ice so that the line guide section, the reel retaining section and the handle section project downwardly through the hole.

3,888,036
SINKER AND SWIVEL SHIELD

Maynard Wallace, 38172 Seaway Dr., Mt. Clemens, Mich. 48073

Filed Jan. 2, 1974, Ser. No. 430,253
Int. Cl. A01k *95/00*
U.S. Cl. 43—44.97 **5 Claims**



1. A shield for sinkers and swivels used on the ends of fishing lines, comprising a hollow thin-walled conical member fabricated of resilient material, the wall being conical, relatively thin and of constant thickness substantially throughout its entire length whereby its resilience will permit it to bounce off rocks, the member being provided with an open base and an apertured apex for receiving the end of the fishing line, whereby the fishing line may be drawn through the shield and attached by a knot to the swivel and sinker, the size of the aperture in said apex being sufficient to allow the fishing line to pass freely therethrough but substantially less than that of the swivel whereby the swivel and knot may not pass therethrough even when tensile force is applied to the line, the relative dimensions of the shield and sinker being such that when the fishing line is drawn back through the apertured apex, the sinker will engage internal surfaces of said shield when the sinker, swivel and knot are enclosed by the shield so as to prevent snagging on weeds or rocks, and the swivel will be held free of the inside surface of said member whereby it may effectively perform its swivelling function to permit said sinker and shield to rotate together as a unit.

3,888,037
POLYCHROIC FISHING LINE

Raymond L. Warthen, Spirit Lake, Iowa, assignor to Berkley & Company, Inc., Spirit Lake, Iowa

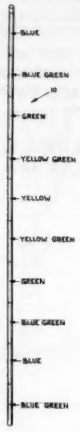
Filed Jan. 21, 1974, Ser. No. 435,288
Int. Cl. A01k *91/00*
U.S. Cl. 43—44.98 **14 Claims**

1. Polychroic fishing line comprising:

a. a continuum of line consisting of a plurality of discretely colored segments including a first plurality of individual line segments being of a chroma having a basic foundation and a first primary color and a second plurality of individual line segments being of a chroma having a basic foundation in a second primary color, and connective segments within said continuum and extending between individual members of said first individual and said second individual segments;

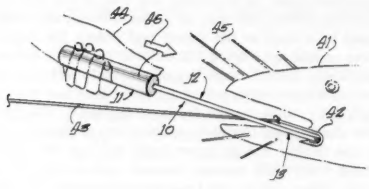
b. the arrangement being such that each individual segment

is arranged with each of its neighbors having a chroma spaced apart on the standard Chromaticity Chart by a



difference in the sum of the coordinates being less than about 0.4.

3,888,038
FISHING HOOK REMOVER
Barbara J. Howell, 14226 Julie Dale, Humble, Tex. 77338
Filed Apr. 29, 1974, Ser. No. 465,232
Int. Cl. A01k *97/00*
U.S. Cl. 43—53.5 **1 Claim**



1. A hook remover device intended for removing a fishing hook from the mouth of a fish in a manner avoiding any contact between the body of the fish and the body of the individual who caught the fish, the hook remover device comprising, in combination:

a handle member of an elongated hollow cylindrical configuration having cylindrical side walls, a flat front end, and an open back end;

a compartment of an elongated cylindrical configuration defined interiorly of said side walls and said closed front end with ingress and egress thereof being through said open back end;

a plurality of screw threads formed integrally with said housing side walls exterior thereof adjacent said open back end and extending about the circumference thereof;

a cylindrically shaped cap member having a closed back end surface, an open front end surface, and cylindrical side walls formed integrally with the peripheral edges of said back surface and depending outwardly therefrom;

screw threads disposed about the interior circumference of said cap side wall surfaces from said open front end thereof to said closed back end thereof;

said cap member adapted to be threadedly engaged with said threads on said body member to close said handle member compartment ir. a watertight manner;

said handle member having a diameter of 1 inch and an overall length of about 4 inches;

a generally Z-shaped retaining clip having one end portion thereof permanently affixed to said handle side wall with said clip extending longitudinally along a tangential line disposed along said side wall and spaced therefrom a distance adapted to resiliently engage at its opposite end onto an individual's belt, pants top, and the like for temporarily hanging said handle member in a suspended manner therefrom;

an elongated solid cylindrical rod disposed concentric with said front end of said handle member and having one end affixed thereto with the opposite end projecting outwardly therefrom, said rod being of an even continuous diameter throughout its entire length;

a hook member formed integrally with the projecting free end of said rod, said hook member being formed by bending said free end of said rod back onto itself to point in the direction of said handle member with the bight portion of said hook member projecting outwardly of said handle member;

said rod having a length of about 7 inches;

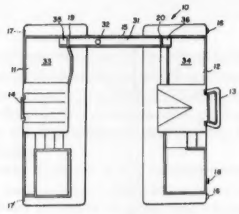
said bent over portion defining said hook member having a length of about 1 inch;

said bent over portion being spaced from said rod a distance of about ⅛ inch;

said bent over portion extending parallel to said rod; and

said bent over portion being of the same cross-sectional diameter continuously therealong as said rod.

3,888,039
FOLDABLE TOY BUILDING
Paul D. Snyder, and Ralph W. Crawford, both of East Aurora, N.Y., assignors to The Quaker Oats Company, Chicago, Ill.
Continuation of Ser. No. 432,436, Jan. 11, 1974, abandoned. This application Sept. 26, 1974, Ser. No. 509,453
Int. Cl. A65h *33/04*
U.S. Cl. 46—12 **11 Claims**



1. A foldable toy building comprising:

a. a pair of disconnectable building portions orientable from a folded, back-to-back disposition to an openedup disposition with said building portions set at any desired angle relative to each other;

b. a separate archway removably joinable to one end of each of said building portions for releasably connecting said building portions;

c. said archway spanning the distance between front corners of said building portions with said building portions in said back-to-back orientation;

d. a vertically oriented resin hinge arranged on each of said building portions at each of said front corners;

e. each of said hinges having a base portion interlocked with one of said building portions in a fixed relation and a free end region extending outward from said building portions and flexibly pivotal relative to said base portion and said building portion;

f. each of said hinges having opposed vertical grooves inward from said free end regions of said hinges making said hinges relatively narrower in the region of said op-

posed grooves and relatively wider in said free end regions outward from said opposed grooves; and

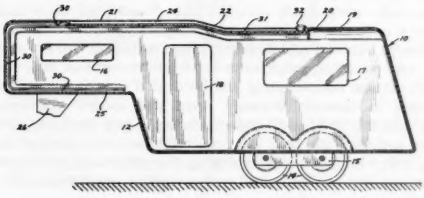
g. each opposite end region of said archway having a vertical slot, each of said slots having a closed upper end, an open lower end, and opening into a recess in said archway, the sides of said slots being shaped to fit in said grooves on said hinges so said archway can be slid down over said hinges and slid back up from said hinges with said free end regions of said hinges being received in said recesses of said archway and said sides of said slots having a vertically slidable fit on said hinges, the pivotal portions of which allow free pivotal motion of said building portions relative to each other and relative to said archway with said archway in place on said hinges, said building portions and archway including means by which each may stand apart from connection with the others.

3,888,040

MINIATURE TOY CAMPER TRAILER

Harlan L. Waterhouse, Excelsior, Minn., assignor to Tonka Corporation, Hopkins, Minn.

Filed May 10, 1974, Ser. No. 468,920
Int. Cl. A63h *17/00*
U.S. Cl. 46—201 **3 Claims**



1. In a miniature toy trailer,

a. a trailer body carrying means for hitch connection to a draft vehicle and having side walls connected by a roof,

b. the roof having an opening therein centered between the side walls,

c. the side walls having opposing tracks extending in parallelism under and at each side of the roof opening and extending beyond the opening,

d. a sliding door having its side edges disposed in said tracks for sliding movement of the door between open and closed positions relative to the opening.

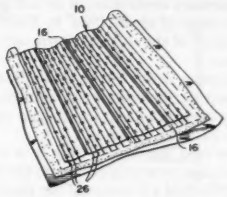
3,888,041

DEVICES, SYSTEMS AND METHODS EMPLOYING KNITTED FABRIC MULCH

Robert T. Seith, Tuscaloosa, Ala., and Otto M. Bundy, Bradenton, Fla., assignors to Gulf States Paper Corporation, Tuscaloosa, Ala.

Division of Ser. No. 333,782, Feb. 20, 1973. This application Aug. 12, 1974, Ser. No. 496,625
Int. Cl. A01g *25/02*
U.S. Cl. 47—9 **7 Claims**

1. A mulch comprising an open-mesh knitted fabric constituted by a multiplicity of knittedly interconnected longitudinal and transverse yarn elements, said fabric having at least one irrigation tube and a multiplicity of parallel strips between longitudinal yarn elements and interleaved with transverse yarn elements of said fabric, said strips being substantially



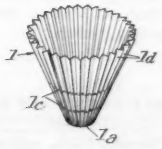
wider than said yarn elements and occupying a major portion of the area of the fabric.

3,888,042

ROOT-BALL WRAPPINGS FOR THE PLANTATION OF PLANTS AND METHODS FOR THEIR MANUFACTURE

Henri Jacques Bourne, 38 Jarcieu, France

Filed May 24, 1973, Ser. No. 363,566
Claims priority, application France, June 23, 1972, 72.22771
Int. Cl. A01c *11/00*
U.S. Cl. 47—37 **8 Claims**



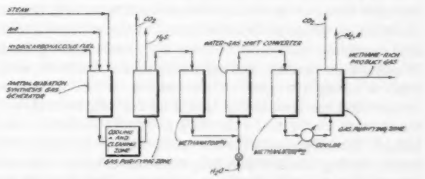
1. A method for wrapping the root-ball of a plant comprising placing a non-woven wrapping of a material comprising a plurality of randomly distributed fibers and having a substantially circular shape around the root-ball so that the wrapping conforms to the shape of the root-ball and the peripheral edges of the wrapping surround the stem-base of the plant and fixing the wrapping in place using a flexible tie to bind the wrapping together in an area adjacent the peripheral edges of the stem-base of the plant.

3,888,043

PRODUCTION OF METHANE

Edward T. Child, Hacienda Heights, and Allen M. Robin, Anaheim, both of Calif., assignors to Texaco Inc., New York, N.Y.

Filed June 25, 1973, Ser. No. 373,351
Int. Cl. C10j *3/00*
U.S. Cl. 48—197 R **17 Claims**



1. A process for producing a stream comprising methane comprising

1. producing a raw process gas stream principally comprising CO, H_2, CO_2, H_2O with minor amounts of CH_4, A, H_2S, particulate carbon and containing from about 30 to 60 mole percent of N_2 dry basis by the noncatalytic par-

tial oxidation of a hydrocarbonaceous feedstock with air or oxygen-enriched air comprising about 21 to 50 mole % O_2 and from about 50 to 79 mole % N_2, and optionally with a temperature moderator, at an autogenous temperature in the range of about 1500° to 3500°F. and a pressure in the range of about 1 to 350 atm. abs. in a free-flow gas generator;

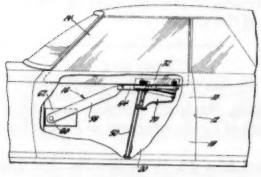
2. cooling, cleaning and purifying the effluent gas stream from 1 to produce a feed gas for catalytic methanation substantially comprising CO and H_2 and containing from about 32 to 62 mole % nitrogen.
3. reacting the feed gas stream from 2 in a first catalytic methanation zone at a temperature in the range of about 400° to 1500°F. and a pressure in the range of about 1 to 350 atm. abs. until substantially all of the H_2 is reacted with a portion of the CO to produce a process gas stream comprising CO, N_2, A, CH_4 and optionally CO_2 and H_2O;
4. introducing the effluent gas stream from 3 into a water-gas shift conversion zone at a suitable temperature along with supplemental H_2O, and reacting therein H_2O with a portion of the CO in said gas stream to produce a process gas stream comprising H_2, CO, CO_2, CH_4 and N_2, and removing any excess water therefrom;
5. adjusting the temperature of the effluent gas stream from 4 to a temperature in the range of about 400° to 1000°F., and reacting the H_2 and CO in said gas stream in a second catalytic methanation zone to produce a gas stream principally comprising CH_4, CO_2, H_2O, N_2 and optionally minor amounts of H_2, CO and A; and
6. cooling the effluent gas stream from 5 and separating impurities therefrom to produce said product stream principally comprising methane.

3,888,044

FOLDING STABILIZER LINKAGE FOR VEHICLE WINDOW

Leonard A. Lystad, Warren, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jan. 16, 1974, Ser. No. 433,752
Int. Cl. E05f *11/52*
U.S. Cl. 49—227 **3 Claims**



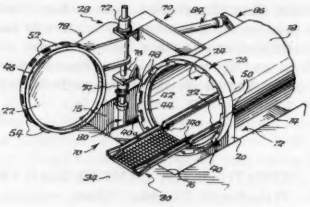
1. In a vehicle body having a window opening, a window movable between raised and lowered positions with respect to the opening, guide means connected to the window and movably mounting the window on the body and defining the path of window movement, and operating means for so moving the window along the path of movement, a stabilizer linkage comprising: track means mounted on the vehicle body within the storage cavity and extending generally vertically, means slidably interengaged with the track means, foldable linkage means having one end pivotally connected to the means slidably interengaged with the track means and the other end pivotally connected to the window at a point longitudinally spaced from the connection between the window and the guide means, means urging the foldable linkage to a normal unfolded position stabilizing the window, and means acting to fold the foldable linkage as the window is lowered to permit increased lowering of the window.

3,888,045

CONSTRUCTION FOR MOUNTING A DOOR OF A PIT MOUNTED PRESSURE VESSEL

Henry J. Piegza, Clarence, N.Y., assignor to WSF Industries Inc., Tonawanda, N.Y.

Filed May 30, 1974, Ser. No. 474,311
Int. Cl. E05f *7/02*
U.S. Cl. 49—255 **11 Claims**



1. A door mounting mechanism for use with a horizontally disposed pressure vessel of the type having a shell defining access opening closeable by said door and a rotatable locking ring mechanism for releasably locking said door in access opening closed position, said shell being mounted within a pit of a depth sufficient to permit a material carrier to be moved essentially horizontally into and out of said shell when said door is in an open position over a bridge removably positioned to bridge between said shell and a floor surface in front of said pit, said mounting mechanism serving to mount said door for both vertical reciprocating and horizontal swinging opening-closing movements between open and closed positions, whereby the "bridging" distance between said shell and said floor surface is less than that required to accommodate solely for horizontally directed swinging movements of said door between said positions, and said mounting mechanism comprising:

a vertically extending bearing shaft;

a first hinge part for mounting said bearing shaft for both horizontally directed rotary and vertically directed reciprocating movements;

a second hinge part having one end thereof affixed to said bearing shaft for movement therewith and an opposite end thereof connected to said door;

a lift control cylinder for imparting vertical reciprocating movements to said bearing shaft, whereby to effect vertical reciprocating movements of said door;

a swing control cylinder for imparting rotary movements to said bearing shaft; whereby to effect horizontal swinging movements of said door; and

circuit means for sequentially controlling operation of said lift and swing control cylinders, whereby in succession to swing said door horizontally from closed position sufficiently to clear said locking ring mechanism, to lift said door vertically sufficiently to clear said floor surface and to swing said door horizontally into said open position.

3,888,046

AUTOMATIC ASTRAGAL

Richard A. Meisterheim, Dowagiac, Mich., assignor to Kawneer Company, Inc., Niles, Mich.

Continuation-in-part of Ser. No. 272,387, July 17, 1972. This application Jan. 28, 1974, Ser. No. 436,952
Int. Cl.² E05C *9/14*
U.S. Cl. 49—319 **9 Claims**

1. An automatic astragal assembly for attachment to the edge of a door comprising:

an elongated astragal housing member having a first edge slot;

an elongated astragal retractable relative to said slot and of generally U-shape cross-section having a pair of spaced side members defining a second edge slot confronting the first edge slot;

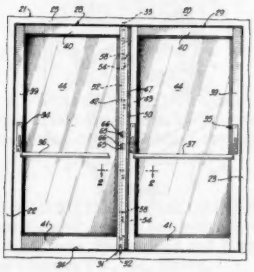
an elongated actuating member positioned at least in part within said second edge slot;

motion translating means operatively connecting said actuating member and said astragal for projecting said withdrawing said astragal in response to vertical movement of said actuating member;

projecting bolt means, said actuating member being operatively associated with said projecting bolt means;

a panic bar, said panic bar being operatively associated with said actuating member;

said motion translation means including a motion guiding mechanism guiding said astragal through projecting and



retracting movement while preventing vertical movement thereof;

said motion guiding mechanism comprising a guide pin fixed to the astragal and horizontally movable in guide slots in said astragal housing member, said actuating member having a clearance slot for said guide pin angled inwardly and downwardly;

motion driving mechanism driving said astragal between its projected and retracted positions in response to vertical movement of said actuating member;

said motion driving mechanism comprising a drive pin fixed to one of said members and guided for vertical movement in a slot in the other of said members; and

said astragal being provided with a drive slot angled outwardly and upwardly at the same slope as said clearance slot and receiving said drive pin.

3,888,047

WINDOW REGULATOR FOR MOTOR VEHICLE

Takayo Chikaraishi, Tokyo, Japan, assignor to Nissan Motor Company Limited, Yokohama, Japan

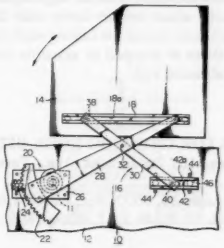
Filed May 22, 1973, Ser. No. 362,844

Claims priority, application Japan, May 23, 1972, 47-60183

Int. Cl. E05f *11/44*

U.S. Cl. 49—351 **5 Claims**

1. A window regulator mechanism for raising and lowering a window pane in a motor vehicle door body having an inner panel, comprising a first arm secured at its one end to a gear segment meshing with a pinion gear mounted on said door inner panel and connected at its other end to said window pane, a second regulator arm pivotally connected to said first regulator arm by a pin at a point spaced apart from said gear segment and connected at its one end to said window pane, said second regulator arm being provided with a roller having an annular enlarged portion thereof at the other end of said regulator arm, said enlarged portion having an annular cylindrical surface thereon, and a guide rail being formed integrally with said door inner panel and including a pair of opposing stepped portions, said stepped portions having opposite parallelly extending plane surfaces thereof for rollably securely



receiving therebetween the annular cylindrical surface of the enlarged portion of said roller to guide the other end of said second regulator arm.

3,888,048

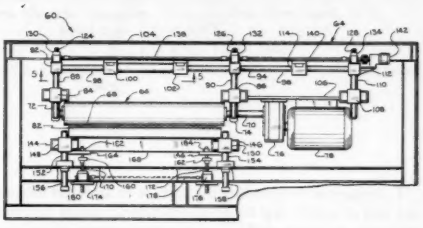
METHOD AND APPARATUS FOR REMOVING SCALE FROM METAL SHEETS

Ford B. Cauffiel, 4940 Homerdale Ave., Toledo, Ohio 43623

Filed July 23, 1973, Ser. No. 381,879

Int. Cl. B24b *7/12*

U.S. Cl. 51—39 **4 Claims**



2. Apparatus for removing scale from a metal sheet, said apparatus comprising a hub, a multiplicity of flexible sheets extending generally radially from said hub, each of said flexible sheets having an abrasive surface facing in a common direction, means for rotating said hub at a high speed in the common direction, means for supporting the metal sheet in contact with outer edge portions of said flexible sheets, means for moving said metal sheet in a given direction between said flexible sheets and said supporting means, said supporting means comprising two back-up rolls having axes parallel to the axis of said hub and located symmetrically on opposite sides of a vertical plane extending through the axis of said hub, and positioned to engage the metal sheet at the same time and to support it in contact with the outer edge portions of said flexible sheets, an additional back-up roll, and means for mounting said additional back-up roll with its axis in the plane extending through the axis of said hub and spaced toward said hub from said two back-up rolls.

3. Apparatus for removing scale from a metal sheet, said apparatus comprising means for directing the metal sheet along a predetermined path, an upper abrasive roll located above said path and positioned to contact an upper surface of the metal sheet when moving along the path, at least one back-up roll positioned on the side of the path opposite said abrasive roll to support the sheet in contact with said upper abrasive roll, means for rotating said abrasive roll at high speed, a lower abrasive roll located below the path and posi-

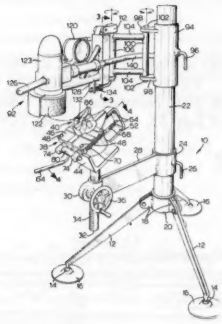
tioned to contact a lower surface of the sheet when moving along the path, at least one additional back-up roll located on the side of the path opposite said lower abrasive roll to support the sheet in contact with the lower abrasive roll, means for rotating said lower abrasive roll at high speed, means for engaging said metal sheet on the same side thereof as said lower abrasive roll, and means for raising said engaging means when the metal sheet is stopped to separate the metal sheet from said lower abrasive roll.

3,888,049

APPARATUS FOR GRINDING ROCK BIT INSERTS

George MacSween, 161 Bridgeland Ave., Toronto, 390 Ontario, Canada

Filed Sept. 28, 1973, Ser. No. 401,621
Int. Cl. B24b *3/33;* **B23q** *3/06*
U.S. Cl. 51—54 **5 Claims**



1. Apparatus for grinding the surface of an insert located at one end of a rock drill bit body comprising means for holding said body to locate said insert in a predetermined position, a driven cup shaped grinding wheel having a planar lip, moveable support means for said wheel comprising a first transversely rotatable arm and a second transversely rotatable arm rotatable with respect to said first arm, said grinding wheel being located on said second arm, whereby said planar lip of said grinding wheel is transversely moveable across said insert during grinding; and means acting between said support means providing limited movement of said planar lip into said insert, comprising a member pivoted on said first arm about a transverse axis and secured to said second arm, stop means on said first arm, and biasing means supported by said first arm urging said member away from said stop.

3,888,050

METHOD OF AND APPARATUS FOR RAPIDLY AND SIMULTANEOUSLY ABRADING METAL WORKPIECES IN PRESELECTED PLURAL NUMBERS

Donald C. Elm, St. Paul, Minn., assignor to Timesavers, Inc., Minneapolis, Minn.

Filed Feb. 19, 1974, Ser. No. 443,918
Int. Cl. B24b *21/00, 1/00*
U.S. Cl. 51—135 R **47 Claims**

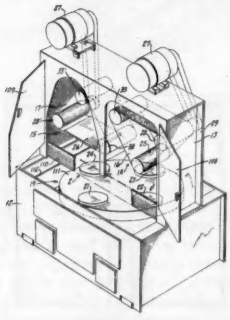
1. A grinding machine comprising the combination of:

A. a turntable having a plurality of work supports positioned to travel in a circular orbit upon rotation of the turntable, there being an even number of said work supports arranged in substantially diametrically opposite pairs with respect to the turntable axis;

B. a pair of abrading heads above the turntable at substantially diametrically opposite locations on the circular orbit of the work supports, so that said locations constitute work stations,

each of said abrading heads having a power driven endless abrasive belt and a backup member to hold a downwardly facing stretch of the belt against a workpiece on a work support therebeneath;

C. means to effect relative motion towards one another between the abrasive belts and the work supports then at the work stations, to thereby produce and maintain work



performing engagement between both abrasive belts and the workpieces on said work supports; and

D. means for indexing the turntable in increments so related to the orbital distance between the work supports that with each index a pair of opposite work supports is brought to said work stations and another such pair is brought to intermediate stations on the circular orbit of the work supports,

so that during the intervals between indexing of the turntable, the two workpieces at the work stations can be ground while loading and unloading of workpieces can take place at at least one of said intermediate stations.

3,888,051

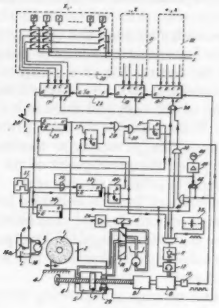
CONTROL OF THE MOTION OF A WORK TOOL CARRIAGE

Heinz Beithle, Aichelberg, Germany, assignor to Fortuna Werke Maschinenfabrik AG, Stuttgart, Germany

Filed Dec. 20, 1973, Ser. No. 426,938
Claims priority, application Germany, Dec. 27, 1972, 2263452
Int. Cl. B24b *49/04*
U.S. Cl. 51—165.77 **15 Claims**

1. In a machine tool in combination, a work tool carriage mounted for movement along a predetermined path towards and away from a workpiece; moving means for moving said carriage along said path and including rotatable means operative for causing said moving means to move said carriage along said path a distance proportional to the number of rotations performed by said rotatable means; selecting means for selecting a distance to be travelled by said carriage along said path; pulse-generating means operative for detecting rotation of said rotatable means and generating a pulse each time said rotatable means rotates through a predetermined angle; and control means receiving pulses generated by said

pulse-generating means and operative for initiating operation of said rotatable means and for thereafter automatically terminating operation of said rotatable means in response to receipt of a sequence of pulses corresponding to the selected distance.



3,888,052

RELATING TO METHODS FOR GRINDING RAILS

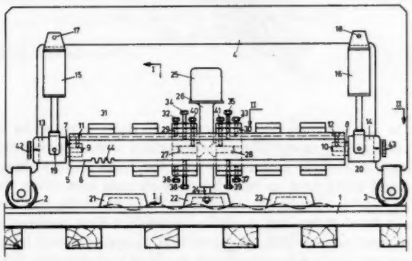
Romolo Panetti, Geneva, Switzerland, assignor to Speno International S.A., Geneva, Switzerland and Frank Speno Railroad Ballast Cleaning Co., Inc., Ithaca, N.Y.

Filed June 7, 1973, Ser. No. 367,875

Claims priority, application Switzerland, June 8, 1972, 08498/72

Int. Cl. B24b *1/00*

U.S. Cl. 51—281 R **8 Claims**



1. A method of truing a rail by grinding comprising mounting a reference base by two point contact with a rail to be ground, adjustably mounting a plurality of spaced grinders on the base to co-operate with the rail at respective grinding zones in line with said two points, and adjusting the longitudinal spacing between the grinders to shift said grinding zones longitudinally of the two point line to an optimum position dependent on the irregularities of the rail to be trued.

3,888,053

METHOD OF SHAPING SEMICONDUCTOR WORKPIECE

Joseph Paul White, and Paul Joseph Delpriore, both of Somerville, N.J., assignors to RCA Corporation, New York, N.Y.

Filed May 29, 1973, Ser. No. 364,660

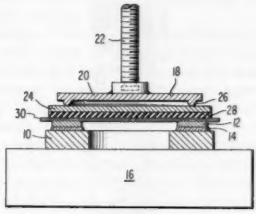
Int. Cl. B24b *1/00, 7/22*

U.S. Cl. 51—281 SF **3 Claims**

1. In a process for shaping semiconductor workpieces, the steps of:

providing a layer of wax adhesive on a surface of a mounting plate and disposing a number of workpieces on said layer, and

applying a uniform pressure to each of said workpieces for pressing them into said layer utilizing a compressible pressure applying means to accommodate thickness variations among said workpieces and a slip plate disposed between said compressible pressure applying means and said workpieces for preventing stressing of said workpieces in directions parallel to said layer.



3,888,054

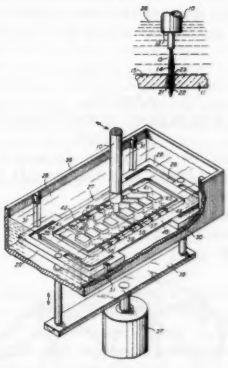
METHOD FOR ABRASIVE CUTTING IN A LIQUID

Nicholas F. Maselli, East Hampstead, N.H., assignor to Western Electric Company, Incorporated, New York, N.Y.

Filed Nov. 16, 1973, Ser. No. 416,553

Int. Cl. B24c *1/00, 1/04*

U.S. Cl. 51—319 **9 Claims**



1. A method of forming an aperture in material, comprising the steps of:

covering the surface of the material at a site at which the aperture is to be formed, with a liquid; and

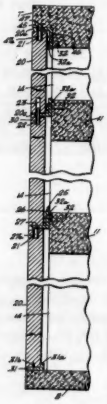
propelling a stream of abrasive particles, carried in a fluid under pressure, against the covered surface of the material to form the aperture in the material.

3,888,055

CRYPT WALL CONSTRUCTION HAVING REMOVABLE FRONTS SECURED BY CONCEALED FASTENERS AND METHOD OF CONSTRUCTION

Roberto A. Gallo, 2468 Wiley St., Hollywood, Fla. 33020

Filed Sept. 25, 1973, Ser. No. 400,542
Int. Cl. E04h *13/00*; E04b *2/88*
U.S. Cl. 52—98 6 Claims



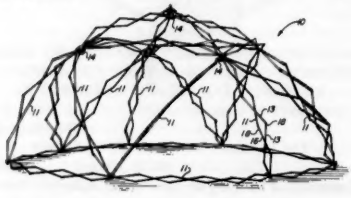
1. A method of constructing a wall of individually removable fronts for a burial crypt structure in vertical tiers comprising the steps of forming spaced seats and a center bore in the top edges and a center bore in the bottom edges of the fronts, the bores being in alignment and the bottom bore having a depth about twice that of the top bore, installing the fronts, tier by tier commencing at the bottom, said installation including the steps of locating adjacent fronts on previously installed brackets of a lower tier by means of pins extending between said center bores, positioning brackets having means for engaging seats of said adjacent fronts on the top edges thereof, drilling holes in the crypt structure to register with openings in said bracket for fastening the latter thereto, inserting expansion bolts through said bracket openings and into said holes, and expanding the bolts to secure the bracket to the crypt structure.

3,888,056

ERECTABLE BUILDING STRUCTURE JUNCTION ELEMENT

Vincent M. Kelly, 61 Hassayampa Country Club, Prescott, Ariz. 86301, and Henry H. Schrieber, 631 East Wesleyan, Tempe, Ariz. 85282

Filed Oct. 25, 1973, Ser. No. 409,436
Int. Cl. A45f *1/16*; E04h *12/18*
U.S. Cl. 52—109 3 Claims



1. A junction element for interconnecting a plurality of expandable trusses forming a portion of an erectable framework for a building structure, each expandable truss comprised of a scissor-type mechanical strut having at least one pair of linkages pivotally connected at a point between their ends, said junction element comprising:

a plurality of substantially axially aligned hubs positioned along a rod, the number of said hubs grouped into sets of three;

a plurality of lugs fastened around the periphery of each hub;

means for pivotally fastening the pivot point of the paired scissors-type linkage at the end of one expandable strut to one lug of the central hub of a group of hubs;

a first and second arm pivotally fastened respectively at one end to a lug of the first and third hub of the group, the other ends of the arms being each pivotally fastened to one linkage of the scissor-type mechanical truss at a position between the pivot point of the linkage and the pivot connection to the next linkage;

the relative position of the first and third hubs to the central hub of one junction element determining the distance between the common ends of the linkages of the scissors-type struts and thus determining the length of said expandable trusses,

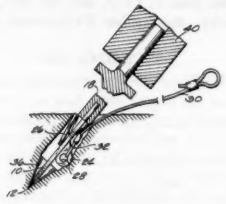
said central hub of each group being fastened to said rod while the first and third hubs are slidably fastened thereto.

3,888,057

GROUND ANCHOR WITH PIVOTING FLUKE

Raymond H. Zubke, Route 1, 2625 Church Rd., Jackson, Wis. 53037

Filed Feb. 21, 1974, Ser. No. 444,453
Int. Cl. E02d *5/80*
U.S. Cl. 52—163 10 Claims



1. In a ground anchor having a fixed fluke adapted to be driven into the ground along a longitudinal axis, a driving tool having a releasable connection with the fixed fluke to leave the fixed fluke free to turn laterally to said axis when the driving tool is withdrawn, a movable fluke pivotally attached to said fixed fluke and movable between a first position in which said movable fluke is substantially parallel to said longitudinal axis and a second position in which said movable fluke is transverse to said longitudinal axis, a cable coupled to said movable fluke and operable to move said movable fluke from said first position thereof toward said second position thereof in response to a pull on said cable, abutment means on said fixed fluke engageable with said movable fluke to limit its movement in said second position thereof, means including said cable and said abutment means for exerting turning torque between the movable fluke and the fixed fluke when said movable fluke is in its second position and turn said fixed fluke transverse to said axis to set the anchor in the ground.

3,888,058

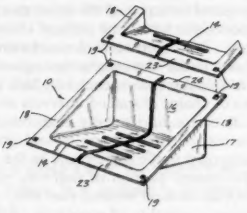
STAIR UNIT FOR A STAIRWAY

Claude W. Ahrens, Box 275, Grinnell, Iowa 50112

Filed Apr. 22, 1974, Ser. No. 463,065
Int. Cl. E04f *11/12*
U.S. Cl. 52—191 2 Claims

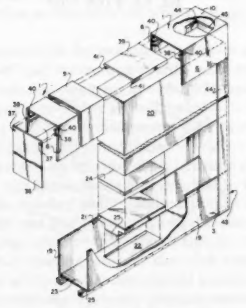
1. A stairway comprising:

a. a pair of transversely spaced side members,
b. a plurality of like one piece stair units, each of which includes a tread section, a riser section and end sections of a triangular shape connected to and extended between corresponding ends of said tread section and riser section,
c. a continuous flange extended laterally outwardly from the forward side of said tread section and the upper sides of said riser section and end sections, said flange lying in a plane normal to said side sections,



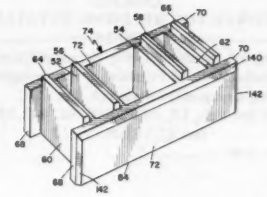
d. said stair units located between said side members with the flange portions corresponding to said side sections supported on the upper surfaces of said side members and the flange portion corresponding to a tread section on one stair unit arranged in a superposed relation with the flange portion corresponding to a riser section on a next adjacent stair unit, and
f. means for securing said side section flange portions to said side members.

3,888,059
PARTITION WALL CONSTRUCTION
Clayton MacLennan, 6814 Lowell Crescent St., and Orville W. Haagenson, 4212 Blow St, N.W., both of Calgary, Alberta, Canada
Division of Ser. No. 324,010, Jan. 16, 1973. This application Dec. 6, 1973, Ser. No. 422,109
Int. Cl. E04b *2/78*
U.S. Cl. 52—241 **5 Claims**



1. A removable partition wall construction adapted to be positioned between a floor and a ceiling, comprising:
a. an upper generally U-shaped channel member having a base portion attached to a ceiling and a pair of transversely spaced, longitudinally extending dependent leg portions;
b. a plurality of vertically extending stud members each having a generally I cross-sectional configuration, each stud comprising a pair of spaced side webs joined by a transverse cross web;
c. the side webs at the upper end of each stud being located within and parallel to the leg portions of said channel member;
d. each stud including guide means adjacent the upper end thereof;
e. a member vertically slidable in said guide means and fixedly secured to the base portion of said upper channel member;
f. said stud member being located with its lower end in abutment with the floor;
g. a plurality of lower, generally U-shaped channel members, each of said U-shaped channel members having a base portion and a pair of transversely spaced upstanding leg portions, the ends of the lower channel member extending between two adjacent studs between said side webs; and
h. at least one aperture in said base portion of each of the lower U-shaped channel members with a floor anchor member extending through such aperture for supporting the weight of panel web members of said wall.

3,888,060
CONSTRUCTION ASSEMBLY AND METHOD INCLUDING INTERLOCKING BLOCKS
Juan Haener, 8215 Harton Pl., San Diego, Calif. 92120
Filed Dec. 17, 1973, Ser. No. 425,299
Int. Cl. E04c *1/08, 1/10, 1/30*
U.S. Cl. 52—286 **38 Claims**



1. An interlocking block for use in wall construction assemblies, which assemblies involve the interlocking of a plurality of substantially identical blocks to create a substantially continuous planar wall surface, and wherein said wall construction assemblies have a plurality of linear courses of blocks, with each said linear course comprising a plurality of abutting blocks laid end to end, and wherein the blocks in the courses lying staggered and below any linear course are in stabgered relationship to the blocks in it's underlying or overlying linear course, said block comprising:
a pair of spaced parallel side walls having flat upper and lower faces,
means to maintain said side walls in a spaced relationship, a plurality of first locking means connected to said side walls, and disposed between the upper section of said side walls,
said first locking means including a plurality of projections extending above the upper face of said side walls,
cooperative locking means having cooperating portions connected to said side walls and disposed between the lower section of said side walls,
said cooperating locking means terminating at the plane of said lower face,
the thickness of said projections being less than the thickness of said cooperating portions,
whereby the projections above the upper face of the side walls on one block are adapted to cooperate in locking relationship with the lower cooperating portions of a block placed above said one block to prevent transverse or longitudinal displacement of the blocks relative to one another.

3,888,061
COMPONENT PART OF LAMINATED BOARD AND A PROCESS FOR MANUFACTURING SUCH COMPONENT PART

Olof Kahr, Transtorpsvägen 237, 382 00 Nybro, Sweden

Filed May 24, 1973, Ser. No. 363,497
Int. Cl. B32b *3/10*
U.S. Cl. 52—589 **13 Claims**

1. A core for floor boarding comprising:

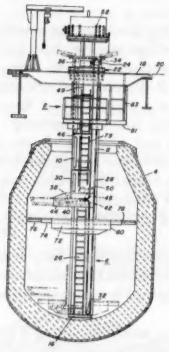
at least two oblong panels, each consisting of wood boards and each having its boards disposed in first patterns, recurrent longitudinally of the oblong panel, of first, mutually parallel boards having a first direction relative to the oblong panel, and in second patterns, between the first patterns, of second, mutually parallel boards having a second direction relative to the oblong panel, the panels being laminated together and having boards of each first pattern of one panel interlocked transversely with boards of a second pattern of another panel laminated with said one panel, and vice versa, and

at least two pairs of elongate edge fillets, each fillet extending longitudinally of one of the oblong panels and having a first edge secured to one side edge of the panel, such fillets of each pair thereof facing one another, being laminated together with one another and having substantially coincident, free, second edges to define fillet surfaces of different width, facing one another, whereby the core has, between its panels and edge fillets, substantially step-like joints reinforcing side edge portions of the core.

3,888,062
WORK TOWER FOR RELINING METALLURGICAL VESSELS

Thomas Gregord, Hudson, Ohio; Bernard Filipich, and William Jancosko, both of Pittsburgh, Pa., assignors to Vulcan Engineering Company, Pittsburgh, Pa.

Filed Feb. 14, 1974, Ser. No. 442,323
Int. Cl.² E04G *21/14*
U.S. Cl. 52—749 **16 Claims**



1. In an apparatus for lining the walls of a metallurgical vessel with refractory bricks which apparatus includes support means over the top opening of the vessel, elongated tower means suspended within the vessel from the support means and rotatably movable thereon, and first conveyor means, in the tower and rotatably movable therewith, for conveying bricks vertically within the vessel, the improvement comprising:

a second conveyor means having a laterally extending brick conveying upper surface of adjustable length vertically movable on the tower means for transporting bricks between the tower means and the walls of the vessel at variable heights and distances from the tower means; and wherein

said first conveyor means comprises:

a plurality of sprockets;

two pairs of endless chains traveling in the same direction on a path defined by the sprockets, which path has two vertical runs between upper and lower sprockets rotatably mounted at fixed positions on the tower, one said vertical run having a first portion in which one pair of chains travels in a plane parallel to, and laterally disposed from, the plane of travel of the other pair, and a second vertical portion in which the pairs of chains travel in the same plane, the other vertical run having the pairs of chains travel in the same plane throughout the run;

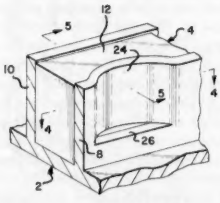
a plurality of foldable pallets each of which is connected to both pairs of chains at spaced intervals along the chains, which pallets are horizontally suspended between the chains during the first portion of said one vertical run, and are disposed in the same plane as the pairs of chains during the second portion of said one vertical run and throughout the second vertical run; and

a frame having a plurality of sprockets rotatably mounted and arranged thereon to guide one of said pairs of chains along a substantially horizontal path between the two laterally displaced planes of the first portion and the common plane of the second portion of said one vertical run which imparts substantial horizontal movement to the foldable pallets as they pass from said first to second portion of said one vertical run, said frame being vertically movable on the tower to vary the respective lengths of said first and second portions of said one run and to align the horizontally moving foldable pallets between said first and second portions in brick transferring relationship with the second conveyor whereby bricks are conveyed between the exterior of the metallurgical vessel and the interior walls thereof through vertical movement by said first conveyor and lateral movement by said second conveyor.

3,888,063
FASTENINGS AND CORNER JOINTS

Robert Houston Frantz, Carlisle, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jan. 29, 1971, Ser. No. 110,908
Int. Cl. F16b *7/00*
U.S. Cl. 52—753 D **19 Claims**



1. A connecting device for forming a corner joint among three structural members, said device comprising:

first, second, and third arms said arms having rectangular cross sections,

said first and second arms being perpendicular to each other and defining a first plane, said first and second arms having sides which are substantially parallel to said first plane,

said third arm extending perpendicularly from said first arm at a location spaced from the juncture of said first and second arms, said first and third arms defining a second plane which extends normally of said first plane, said

third arm having sides which are substantially perpendicular to said second plane,

recesses on at least one of said sides of each of said arms, said recesses extending partially across said sides and being adapted to receive portions of said structural members, and

projections on said second arm on one side which is between said sides, said projections being adapted to be received in said structural members whereby,

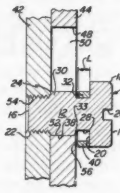
said first and third arms can be located between parallel ribs on two structural members extending perpendicularly with respect to each other and abutting each other, and said second arm can be located against a rib on an additional structural member which abuts, and extends normally from, said first and second structural members, said structural members being securable to said device upon deformation of said ribs into said recesses.

3,888,064

MULTIPLE GRIP LENGTH MOUNTING BOLT

Peter A. Basile, Edison, N.J., assignor to Amerace Corporation, New York, N.Y.

Filed Nov. 16, 1973, Ser. No. 416,439
Int. Cl.[2] F16B *5/02, 35/00*
U.S. Cl. 52—758 F **10 Claims**



1. Apparatus for mounting an item upon either of at least two mounting boards of differing thicknesses, said apparatus comprising, in combination:

a. at least two mounting boards of differing thicknesses, each of said boards containing at least one laterally extending keyhole configured slot passing through the thickness thereof, each of said slots having a larger diametered portion interconnected with a smaller diametered portion;

b. an item adapted to be mounted in juxtaposition with at least one of said mounting boards, said item having a portion, including securing means, adapted to be positioned adjacent to either of said boards;

c. a mounting bolt adapted to mount said item on either of said boards, said bolt comprising:

i. a shank extending longitudinally between opposite ends thereof, said shank being dimensioned to be positioned within the smaller diametered portion of said slot;

ii. a head at one end of said shank, the diameter of said head being smaller than the diameter of the larger diametered portion of said slot and larger than the diameter of the smaller diametered portion of said slot, said head defining a primary gripping surface extending laterally relative to said shank, said primary gripping surface adapted to engage the thicker of said mounting boards adjacent said smaller diametered portion of said slot;

iii. securing means at the other end of said shank adapted to engage the securing means of said portion of said item so as to secure said mounting bolt to said item with said item at a fixed position on said shank relative to the gripping surface; and

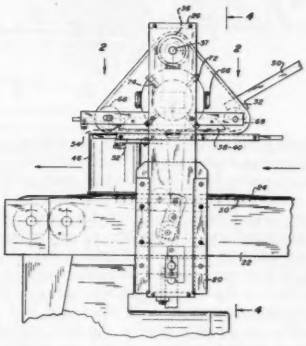
iv. spacing means on said shank between said head and said fixed position, said spacing means including a collar having an auxiliary gripping surface thereon, said collar being captively contained within a recess on said shank and being movable laterally relative to the shank so as to be alternately placed and removed from between the primary gripping surface and said fixed position, said auxiliary gripping surface being adapted to engage the thinner of the said mounting boards adjacent the smaller diametered portion of said slot; the longitudinal distance between the primary gripping surface and the auxiliary gripping surface corresponding essentially to the incremental difference between said board thicknesses.

3,888,065

APPARATUS AND METHOD FOR AUTOMATICALLY POSITIONING AND INSERTING PLASTIC PLUGS IN A CONTAINER TOP

Raymond A. Heisler, 657 Dakota Trail, Franklin Lakes, N.J. 07417

Filed July 3, 1974, Ser. No. 485,501
Int. Cl. B65b *7/28;* **B67b** *1/04*
U.S. Cl. 53—43 **15 Claims**



1. Apparatus for receiving, transporting and delivering containers to a plug inserting station whereat a plastic plug is positioned and inserted into an aperture in the cover of an advancing container, said inserting apparatus including: (a) a support means; (b) a lower conveyor carried by the support means and having means for receiving containers and with their bottoms resting on said conveyor advancing said containers in a single file array to and through a plug inserting station; (c) means for advancing said lower conveyor at a selected rate of travel; (d) a pair of upper transporting chains carried by the support means and having their lower extents parallel to and disposed at a distance above and in alignment with the lower conveyor which distance is slightly greater than the height of a container to be transported; (e) means for retaining the lower extents of the upper chains in a fixed plane parallel to the lower conveyor; (f) spring biasing means for elevating that intermediate portion of the lower conveyor that is in spaced alignment and parallel with the upper transporting chains, said spring biasing means locally elevating the lower conveyor so that a transported container is brought upwardly into engagement with the lower extents of the upper chains to cause the top surface of the container to be moved through the apparatus in an established plane; (g) chute means for feeding and delivering plastic plugs one at a time to a delivery station; (h) a rotatable wheel carried above the upper chains and having a plurality of plug pushers mounted thereon; (i) means for rotating said wheel in a timed relationship with the advancement of the container so that an associated plug pusher on the wheel first engages and then removes the lowermost plug in the chute means and then guides the plug into an aperture in the container cover, said rotatable wheel and plug pusher so spaced from the top of the advancing container that as the

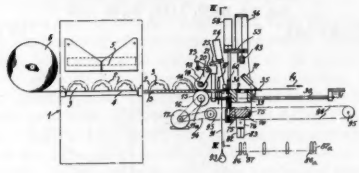
aperture and plug is brought in way of the lowpoint of the circular travel of the plug pusher, the plug carried thereby is pushed into seated engagement in the aperture, and (j) means for the continuation of the rotation of the wheel so that the plug pusher is eventually lifted from inserted engagement with the plug, and the container is free for transport from the inserting station.

3,888,066

MACHINE FOR PERFORMING LONGITUDINAL AND TRANSVERSE CUTTINGS IN SHEETS, PLATES AND SIMILAR PRODUCTS

Marcel Tabur, Le Mans, France, assignor to G.M.T. S.A., Le Mans, France

Filed Oct. 29, 1973, Ser. No. 410,380
Int. Cl. B65b *61/08, 61/16*
U.S. Cl. 53—167 **16 Claims**



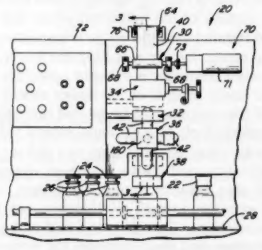
1. Packaging and cutting apparatus comprising a packaging unit for packaging a plurality of objects between a supporting sheet and a covering film bonded to said sheet, a table located near said packaging unit to support said sheet and film to be cut between said objects, a set of blades fixedly placed in an arrangement transverse to said table, a first carriage placed at end of said table on longitudinal guides, said first carriage supporting at least one small bar vertically mobile to press said sheet and film on top thereof, whereby advance of said first carriage causes advance of said sheet and film which are longitudinally cut by said blades, the first carriage further supporting a second carriage placed on guides extending angularly to the guides on which the first carriage is moved, and said second carriage supporting at least one blade protruding above said first carriage, whereby said blade ensures cutting of said sheet and film in transversal direction thereof during a step by step action cycle of said first carriage.

3,888,067

BANDING MACHINE

Radley Cross, Bala Cynwyd, and John Laessig, Newtown Square, both of Pa., assignors to Gilbreth Company, Cornwells Heights, Pa.

Filed Sept. 18, 1973, Ser. No. 398,514
Int. Cl. B67b *5/00*
U.S. Cl. 53—292 **9 Claims**



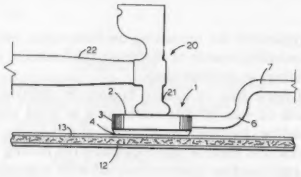
1. Apparatus for providing a band about an article moving along a horizontal path comprising means for supplying a band of a predetermined length, first vacuum means to grip the outer surface of the band to effect the partial opening of the band and to carry said partially opened band along a vertical path to mandrel means disposed therebelow, said mandrel means including a turret having a plurality of mandrels extending radially outward therefrom, said turret being rotatable about a horizontal axis to rotate said mandrels in a vertical plane whereupon one of said mandrels extends vertically upward towards said first vacuum means and one of said mandrels extends vertically downward towards second vacuum means disposed therebelow, each of said mandrels being cylindrical and including a tapered end, the diameter of said mandrels being slightly smaller than the inside diameter of the band when fully opened such that when said first vacuum means places said partially opened band on said mandrel said mandrel effects the more full opening of said band, said second vacuum means for gripping the outer surface of the band disposed on said downwardly extending mandrel to substantially fully open the band and completely remove it from said mandrel by thereafter carrying said band in a downward vertical direction off said mandrel to position it around said article disposed therebelow.

3,888,068

HOLE CUTTING APPARATUS

Damaso P. Zambrano, 3344A Hoolulu St., Honolulu, Hawaii 96815

Filed Aug. 23, 1973, Ser. No. 390,773
Int. Cl. B26f *1/32*
U.S. Cl. 30—358 **5 Claims**

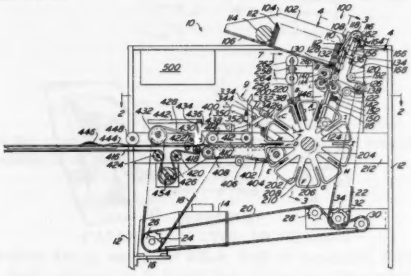


1. A wall board hole cutting apparatus comprising
an anvil plate,
an annular cutting rim, attached to a perimeter of the anvil plate extending perpendicularly downward from a principal plane of the anvil plate, where a lower edge of the annular cutting rim is a cutting edge,
an elongated handle member, with one end attached to the edge of the anvil plate, extending away from the anvil plate in a direction generally parallel to the plane of the anvil plate with a portion of the handle bent upward away from the plane of the anvil plate and with the handle bent a second time to return the configuration generally parallel with the plane of the anvil plate with a distal portion of the elongated handle member displaced upward from the plane of the anvil plate so that the handle may be encircled by a hand with backs of fingers resting on wall board while the annular cutting rim rests on a sheet of wall board, whereby the hole cutting apparatus is held in position on the wall board during a cutting process;
whereby holes are cut in wallboard by manually positioning the hole cutting apparatus with the elongated handle member and by driving the annular cutting rim through the wallboard by impacting an upper face of the anvil plate.

3,888,069
ENVELOPE OPENING MACHINE

Edwin F. Pierce, Bessemer; Larry W. Roberts, Fairfield, and Leland D. Maddox, Hueytown, all of Ala., assignors to Amer-O-Matic Corporation, Bessemer, Ala.

Filed July 1, 1974, Ser. No. 484,368
Int. Cl. B65b *61/00*
U.S. Cl. 53—381 R 15 Claims

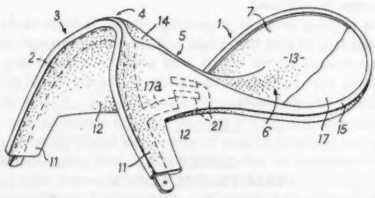


13. An envelope opening machine for automatically opening envelopes and exposing the contents thereof comprising a hopper, a pair of side edge destruction means, a top edge destruction means, means for transferring an envelope from the hopper into alignment with the pair of side edge destruction means for destroying the envelope side edges, means for transferring the envelope from the pair of side edge destruction means into alignment with said top edge destruction means for destroying the envelope top edge, a discharge conveyor for discharging envelopes with their contents exposed, and means between said discharge conveyor and said top edge destruction means for moving one panel of the envelope to a position wherein the contents of the envelope are exposed.

3,888,070
SADDLE TREES AND SADDLES

Robert Eric White, Hounslow, and Robert Oscar Lightfoot, Croydon, both of England, assignors to White Polytechniques Limited, London, England

Filed June 11, 1973, Ser. No. 368,529
Claims priority, application United Kingdom, June 9, 1972, 27029/72; Sept. 1, 1972, 40696/72; Sept. 4, 1972, 40982/72
Int. Cl. B68c *1/00*
U.S. Cl. 54—44 12 Claims

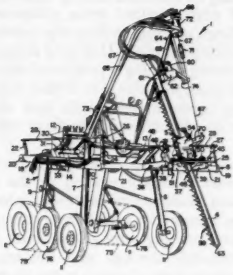


1. A method of making a saddle tree which comprises moulding in one operation a first substantially rigid part of the tree comprising a front neck portion, a mid-waist and seat portion, and a rear cantle portion from plastics material, thereafter while using the first part as a mould part, moulding a second resiliently compressible part of self-skinning foamed plastics material to provide a resilient cushion bonded to at least the majority of the upper surface of the seat and cantle portions of the first part and additionally moulding padding to bond to the rear and underside of the cantle portion.

3,888,071
TREE TRIMMING APPARATUS

Louie E. Wallace, Plainview, Tex., assignor to W. F. Larson, Inc., Plainview, Tex.

Filed Oct. 9, 1973, Ser. No. 404,767
Int. Cl. A01d *55/02*
U.S. Cl. 56—237 14 Claims

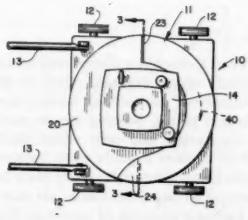


1. A tree trimming apparatus comprising:
a. a mobile support structure;
b. a platform adjustably mounted on said support structure;
c. means operatively connected to said platform and support structure for positioning said platform in a desired attitute relative to the ground;
d. an elongated trimming member having an upper end and a lower end and extending through said platform;
e. means mounted on said platform and engageable with said trimming member for positioning same at a selected angle relative to said platform;
f. means for selectively longitudinally positioning said trimming member relative to said platform; and
g. means operatively connected to said platform for rotating same relative to said support structure thereby moving said trimming member in a path defining a selected geometric surface of revolution.

3,888,072
ROTARY LAWN MOWER

William E. Templeton, 1807 W. Hanley Rd., Lakewood, Ohio 44904

Continuation-in-part of Ser. No. 247,664, April 26, 1972, abandoned. This application May 16, 1973, Ser. No. 360,920
Int. Cl. A01d *67/00*, *55/18*
U.S. Cl. 56—320.2 13 Claims



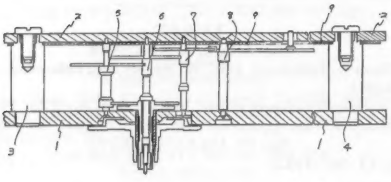
1. A rotary lawn mower comprising:
a. a guard housing supported on ground engaging wheels and defining a downwardly opening chamber which is generally cylindrical about a vertical axis;

b. power drive means carried by said guard housing and having a drive shaft positioned along said axis and depending into said chamber;
c. blade means mounted on said drive shaft for rotation in a generally horizontal plane;
d. said blade means having radially extending portions projecting outwardly from a central region and having an axis of symmetry coincident with the axis of said drive shaft;
e. said radially extending portions each defining an end region including forward and trailing blade edge portions, said forward edge portions being sharpened to form shearing surfaces, and said trailing edge portions carrying forwardly opening generally U-shaped deflectors;
f. said guard housing defining a peripheral discharge opening communicating with one side of said chamber and an inlet opening communicating with said chamber at a position spaced circumferentially from said discharge opening;
g. said guard housing further defining a curved channel of increasing cross section extending in the direction of rotation of said blade means from said inlet opening to said discharge opening for permitting a stream of air to be drawn into said housing through said inlet opening and channeled smoothly through said housing along said channel to entrain grass clippings in the air stream and to discharge the entrained clippings through said discharge opening.

3,888,073
CONSTRUCTION TO FACILITATE ASSEMBLY OF A TIMEPIECE

Masahiro Kurita, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Japan

Filed Dec. 27, 1971, Ser. No. 212,611
Claims priority, application Japan, Dec. 28, 1970, 45-132722
Int. Cl. G04b *13/02*
U.S. Cl. 58—7 **8 Claims**

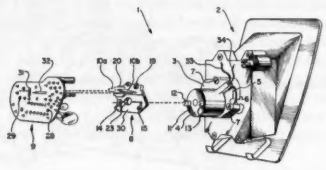


1. In as assembly of a timepiece comprising a base plate and a bridge plate, pillars supporting said plates in fixed spaced relationship, a plurality of gear wheels having support shafts disposed between said plates, bearing means carried by said plates rotatably supporting said gear wheel shafts, the improvement which comprises a guide plate mounted on said pillars adjacent said bridge plate, said guide plate being of thin flexible sheet material having a thickness less than that of the bridge plate and having a plurality of openings through which end portions of the shafts of said gear wheels pass, said openings being large enough to receive the end portions of said shafts freely while small enough to guide and position said end portions of the gear wheel shafts to maintain the latter in alignment with the corresponding bearing means on the bridge plate as the latter is assembled into position on the pillars.

3,888,074
APPARATUS FOR CLOCK

Benno August Wagenknecht, Pforzheim, and Horst Erich Breckle, Munich, both of Germany, assignors to Bunker Ramo Corporation, Oak Brook, Ill.

Filed Aug. 16, 1974, Ser. No. 498,082
Claims priority, application Germany, Aug. 21, 1973, 2342250
Int. Cl. G04c *3/00*; **G04b** *37/00*
U.S. Cl. 58—23 R **15 Claims**



1. A mounting device for use with an electrical clock having an electrical motor and mounted in a housing, said mounting device comprising:
a base plate having two sides;
means on said base plate for mounting said base plate to the electrical motor, whereby said electrical motor projects outwardly from one side of said base plate;
carrier means projecting from the otherside of said base plate for supporting an electrical circuit board; and
electrical coupling means projecting from said base plate for electrically coupling the electrical motor to the circuit board and to an external power supply.

15. An apparatus for an electrical clock which is mounted in a housing, said mechanism comprising:
an electrical motor for driving a time indicator of the electrical clock, said motor having a driving end for coupling to the drive train of a time indicator of the clock, and a support end with a rear wall;
a base plate having an abutting side and a coupling side;
mounting means on said motor and said base plate for mounting the abutting side of said base plate on said rear wall of said motor;
carrier means for projecting from said coupling side of said base plate;
an electrical circuit board fastened to said base plate by said carrier means; and
a pair of plug contacts projecting outwardly from said coupling side of said base plate and extending through openings in said circuit board, said plug contacts having soldering pins for connecting them to the electrical circuit of said circuit board.

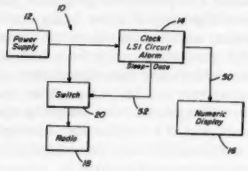
3,888,075
ELECTRONIC CLOCK

Leon S. Wecker, Hallandale, Fla., assignor to Topp Electronics, Inc., Miami, Fla.

Filed Jan. 25, 1974, Ser. No. 436,681
Int. Cl. G04c *3/00*; **G04b** *19/30*
U.S. Cl. 58—38 **10 Claims**

2. In combination with a source of AC voltage and a DC powered clock device having a plurality of outputs connected to a numeric display device, voltage rectifying means connected to said source for supplying DC energizing voltage to said clock device, and means connected to said source for transmitting a continuous, polarity changing excitation voltage to the numeric display device through the outputs of the

clock device, said numeric display device including a plurality of light emitting diodes respectively connected to the outputs



of the clock device and means connected to said source for biasing all of the light emitting diodes.

3,888,076

CALENDER-WATCH MOVEMENT

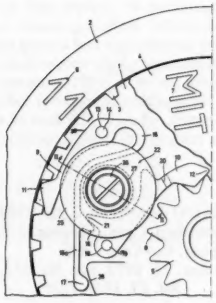
Roland Zaugg, and Josef Flück, both of Grenchen, Switzerland, assignors to A. Schild S.A., Grenchen, Switzerland

Filed Sept. 24, 1974, Ser. No. 508,900

Claims priority, application Switzerland, Oct. 10, 1973, 14431/73

Int. Cl. G04b *19/24*

U.S. Cl. 58—58 **9 Claims**



1. A calendar-watch movement comprising a base plate, at least one indicator member having a toothing and intermittently rotating about the center of said base plate, and means for immobilizing said indicator member or members during the periods between two rotating movements, wherein said means comprise a flat portion of said base plate, a circular retaining plate fastened to said base plate by its center portion and spaced a certain distance above said flat portion, a jumper having a rigid arm and a resilient arm, two catches projecting from said resilient arm at two separate locations along said resilient arm, means for pivoting said jumper on said flat portion, and a biasing element extending opposite one of said catches, both arms of said jumper being situated on the same side of the center of said retaining plate and being covered thereby, said resilient arm being kept biased by the pressure of one of said catches against said biasing element and the other of said catches being freely movable.

3,888,077

MECHANICAL WATCH MOVEMENT

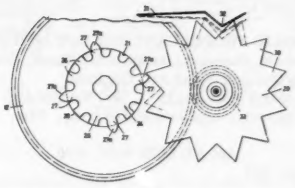
Peter Bachmann, Bettlach, Switzerland, assignor to Ebauches Bettlach S.A., Bettlach, Switzerland

Filed Apr. 29, 1974, Ser. No. 465,077

Claims priority, application Switzerland, May 11, 1973, 6732/73

Int. Cl. G04b *33/00, 13/02*

U.S. Cl. 58—59 **5 Claims**



1. A mechanical watch movement comprising:

a minute-wheel pinion having a plurality of teeth each having a lateral face portion in the form of a cylinderical arc coaxial with said minute-wheel pinion, at least some of said teeth having a further substantially pointed portion which extends from and beyond said arcuate face portion;

a toothed minute-wheel having a thickness which is less than the thickness of said minute-wheel pinion and fixed to said arcuate lateral face portions of said minute-wheel pinion;

a cannon-pinion having teeth which mesh with said toothed minute-wheel; and

a toothed hour-wheel coaxial with said cannon-pinion and having an outside diameter such that only said pointed portions of said minute-wheel pinion engage said toothed hour-wheel.

3,888,078

GOVERNING DEVICE FOR A GAS TURBINE SYSTEM EXEMPLIFIED BY A VEHICULAR OR AIRCRAFT ENGINE

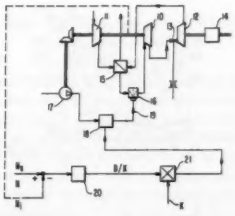
Christian Greune, Furstenfeldbruck, and Friedrich Hackl, Neu-Esting, both of Germany, assignors to Motoren-und Turbinen-Union Munchen GmbH, Germany

Filed Dec. 18, 1972, Ser. No. 316,059

Claims priority, application Germany, Dec. 17, 1971, 2162660

Int. Cl. F02c *9/08*

U.S. Cl. 60—39.28 R **7 Claims**



1. In a gas turbine system including a combustion chamber receiving combustion air from a turbine driven compressor and a fuel metering device for metering the flow of fuel to said combustion chamber, a governing device for controlling said fuel metering device comprising governor means responsive to

a selected engine characteristic to provide an output signal representing the ratio of fuel flow to at least the engine characteristic relating to the rotational speed of a turbomachine in the system and multiplier means connected between said governor means and said fuel metering device and responsive to a regulation signal representing at least the engine characteristic relating to rotational speed for multiplying said output signal of said governor means by said regulation signal, thereby providing a fuel control signal representing required fuel flow to control said fuel metering device.

3,888,079

SOLID PROPELLANT ROCKET MOTOR

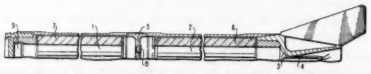
Walter Helmut Diesinger, Bergisch Gladbach, Germany, assignor to Dynamit Nobel AG, Germany

Filed Mar. 26, 1973, Ser. No. 344,631

Claims priority, application Germany, Mar. 25, 1972, 2214802

Int. Cl. F02k *9/04, 9/06*

U.S. Cl. 60—245 **11 Claims**



1. In a solid propellant rocket motor with two or more coaxially arranged combustion chambers containing propellant charges of the same or of a different efficiency arranged in series one behind the other, which chambers cooperate with a common nozzle, are each equipped with one igniting device activatable in a predetermined time interval, and are secured with respect to each other against unintentional burning, the improvement which comprises partition means for separating the propellant charges from each other including closure means that open up, at least partially, to provide a through-flow cross-section due to the excess pressure caused by ignition of the subsequent propellent charge, said partition means including a perforated plate and said closure means including holes in said plate which are sealed by plugs, and means arranged on the side of the perforated plate opposite from said nozzle and attached to said plugs for securing said plugs to said plate.

3,888,080

AIR FLOW CONTROL VALVE

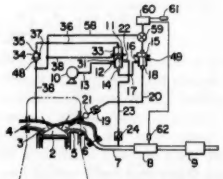
Hidetaka Nohira, Susono, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed June 17, 1974, Ser. No. 480,252

Claims priority, application Japan, June 20, 1973, 48-68691

Int. Cl. F02b *75/10*

U.S. Cl. 60—290 **2 Claims**



1. In an internal combustion engine system in which the unburned component in discharge gas is burned in a catalytic converter mounted downstream of an exhaust pipe and the resulting gas is discharged to the atmosphere and including an engine having an intake manifold and having an exhaust manifold connected to the exhaust pipe, means for controlling the flow of secondary air comprising, in combination:

an air pump for supplying secondary air;

first and second two-position changeover valves, said first two-position changeover valve being connected to provide secondary air from said air pump to a suction port of said second changeover valve in a first position and to provide secondary air to the exhaust pipe upstream of the catalytic converter in a second position, and said second two-position changeover valve coupling said suction port to an exhaust port of a combustion chamber of the engine in a first position and coupling said suction port to the atmosphere in a second position;

first pressure responsive means responsively connected to the intake manifold of the engine connected for momentarily switching said first two-position changeover valve from its first position to its second position in response to a first level of vacuum pressure in the intake manifold;

a first operating valve responsively connected to said intake manifold and connected for introducing atmospheric pressure acting on said first pressure responsive means in response to a predetermined level of vacuum pressure in said intake manifold, whereby said first two-position changeover valve is maintained in its first position when the vacuum pressure in the intake manifold exceeds the predetermined level;

second pressure responsive means responsively coupled to the intake manifold connected for switching said second two-position changeover valve from its first position to its second position in response to a second level of vacuum pressure being lower than the first level;

a second operating valve connected between said second pressure responsive means and the intake manifold for selectively coupling said second pressure responsive means to the intake manifold; and

a controller connected to operate said second operating valve, said controller including means for sensing catalytic converter temperature and closing said second operating valve in response to the temperature of the catalytic converter being above a predetermined level, whereby said second two-position changeover valve is maintained in its first position, whereby the flow of secondary air is controlled in response to engine operating conditions.

3,888,081

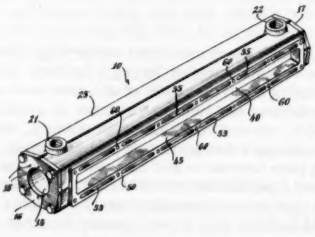
EXHAUST MANIFOLD ASSEMBLY

Robert A. Fitts, Stamford, Conn., assignor to Hekma Advanced Machine Company, Cos Cob, Conn.

Filed Apr. 19, 1973, Ser. No. 352,425

Int. Cl. F01n *7/06*

U.S. Cl. 60—321 **1 Claim**



1. A universal exhaust gas manifold assembly comprising:

A. an exhaust duct assembly comprising,

1. a face plate having a joining surface,

2. a plurality of gas ducts on the side opposite said face plate joining surface and

3. means forming openings in said face plate from said gas ducts, and

B. an elongated cast metal gas receiver having

1. an internal cavity extending lengthwise thereof for receiving exhaust gases,
2. a joining surface extending along the side of said receiver and conforming to said face plate joining surface i. said surface having means forming at least one longitudinal opening therein which is in communication with said cavity, and
   ii. which is aligned to receive gas from two or more of said gas ducts,

whereby said gas receiver may be connected to any one of a number of face plates having varying gas duct locations along the face plate for different internal combustion engine configurations; and

3. means forming a cooling jacket cast around said gas receiver internal cavity, said cooling jacket having a plurality of openings on said gas receiver joining surface through which cooling fluid is brought in contact with said face plate joining surface when said face plate is joined to said gas receiver.

3,888,082

HYDRODYNAMIC TORQUE CONVERTER

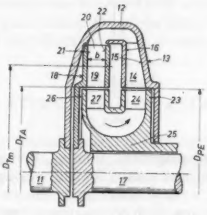
Karl Haide, Friedrichshafen, Germany, assignor to Motoren- und-Turbinen-Union Friedrichshafen GmbH, Germany

Filed Mar. 22, 1974, Ser. No. 453,808

Claims priority, application Germany, Mar. 23, 1973, 2314492

Int. Cl. F16h *41/00*

U.S. Cl. 60—361 **31 Claims**



1. A hydrodynamic torque converter including a pump wheel means centrifugally traversed and a turbine wheel means centripetally traversed, both the pump and turbine wheel means having blade means and wheel side walls, the turbine wheel outlet diameter being approximately equal to the pump wheel inlet diameter, and first guide wheel means arranged substantially directly upstream of the pump wheel means as viewed in the flow direction and a further guide wheel means arranged substantially directly downstream of the turbine wheel means, characterized in that

a. the radial lenght (L_T) of the turbine blade means is larger than about 15 percent of the middle diameter (D_{TM}) of the turbine blade means;

b. the blade spacing of the turbine wheel means at the middle diameter thereof amounts to about 30 percent to about 50 percent of the radial length of the turbine wheel blade means, and

c. the interior width (lW_A) of each blade flow channel at the outlet of the turbine wheel means being smaller than about 35 percent of the blade spacing of the turbine wheel means.

3,888,083

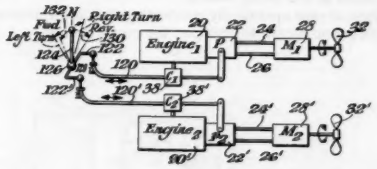
VARIABLE SPEED DUAL HYDROSTATIC DRIVE

John W. Tone, 2601 Foulke Rd., Wilmington, Del. 19810

Division of Ser. No. 308,567, Nov. 21, 1972, Pat. No. 3,826,097. This application June 19, 1974, Ser. No. 480,744

Int. Cl. F15b *11/16;* **F16h** *39/46*

U.S. Cl. 60—431 **8 Claims**



1. A hydrostatic drive system for a ship having a known power demand versus speed characteristic comprising:

first and second prime movers each having first adjustable control means for varying the speed of a respective one of said prime movers,

first and second reversible and adjustable fluid pumps adapted to be driven by corresponding ones of said prime movers, each having second adjustable control means for varying the fluid displacement of a respective one of said pumps,

first and second hydraulic motors hydraulically connected to a different one of said pumps and adapted to drive said ship at speeds related to the speeds of said motors,

first master control means connected to said first prime mover control means and said first pump second control means for adjusting the speed of said first prime mover and the displacement of said first pump,

first manual means for setting said first master control means for a desired ship speed,

second master control means connected to said second prime mover control means and to said second pump second control means for adjusting the speed of said second prime mover and the displacement of said second pump, and

a second manual means for setting said second master control means for a desired ship speed, said first and second master control means operating to adjust the speeds of said first and second prime movers to the minimum required to meet the power demand of said ship at said desired speed, whereby said ship may be steered by manipulation of said first and second manual means.

3,888,084

THERMAL RECOVERY SYSTEM

Gilbert L. Hawkins, 305 Simmons Ave., Webster Groves, Mo. 63119

Filed May 20, 1974, Ser. No. 471,509

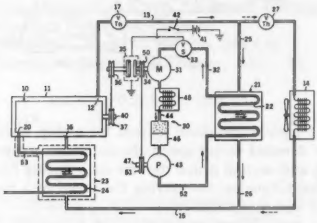
Int. Cl. F01k *23/06*

U.S. Cl. 60—614 **6 Claims**

1. In combination with an internal combustion engine of the type having a cooling and exhaust system in which coolant is circulated from an engine outlet port at relatively high temperature through an outflow conduit to a radiator and from the radiator through a return conduit to an engine inlet port at a relatively low temperature, and in which exhaust gases are passed from the engine through an exhaust port, a thermal recovery system comprising:

a. a first heat exchanger means operatively connected between the outflow conduit and the return conduit in bypass relation to the radiator to receive coolant from the engine and discharge coolant into the return conduit, said first heat exchanger means including a first coil means containing refrigerant to absorb heat from the coolant,

b. refrigerant operated motor means,
c. conduit means delivering refrigerant from the first coil means to the motor means to energize the motor means,
d. drive means operatively connecting the motor means and the engine crankshaft,
e. pump means between the motor means and the first coil means,
f. conduit means delivering refrigerant from the motor means to the pump means,
g. drive means operatively connecting the motor means and the pump means to energize the pump means,

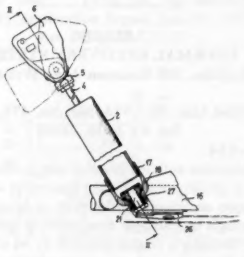


h. conduit means delivering refrigerant from the pump means to the first coil means,
i. a second heat exchanger means disposed in the return conduit to receive coolant from the first heat exchanger means and discharge coolant into the inlet port, said second heat exchanger means including a second coil means operatively connected to the engine exhaust port to convey exhaust gases and impart heat to the coolant prior to entering the inlet port.

3,888,085
PYROTECHNICAL JACKS

Jean-Francois Larsonneur, Billancourt, France, assignor to Regie Nationale des Usines Renault, Billancourt and Automobiles Peugeot, Paris, both of, France

Filed Oct. 30, 1973, Ser. No. 411,154
Claims priority, application France, Nov. 6, 1972, 72.39188
Int. Cl. F01b *29/08;* **F02n** *13/00*
U.S. Cl. 60—635 **1 Claim**

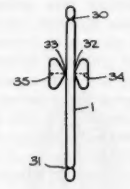


1. A pyrotechnical jack for stretching the webbing of a safety belt or harness in a motor vehicle with one end of the jack being adapted to be anchored to an element of a motor vehicle, said jack comprising:
a cylinder,
a piston slidably fitted in said cylinder,
a hollow head connected to one end of said cylinder,
a traction rod rigidly connected to said piston,
an explosive charge,
an explosion chamber,
means defining a peripheral groove in said piston,
means for locking the piston at the end of its operative stroke, said locking means comprising:
an expansible split ring in said groove, and
a shoulder formed by the end of said cylinder projecting from the inner wall of said hollow head, said shoulder being adapted to retain the piston at the end of its operative stroke by the expansion of the then expanded split ring thereover,
means defining a part-spherical socket in the inner surface of the end of said hollow head most remote from said cylinder,
a ball joint positioned in said socket for the swivel mounting of the jack, said ball joint comprising a shock absorbing element adapted to co-act with the inoperative face of the piston at the end of the operative stroke thereof, and
an element rigidly connected to said ball joint for anchoring the jack to an element of a motor vehicle.

3,888,086
FLOATING BOOM

Gerald W. Robertson, Dumfries, and Terence Sturgeon, Locharbriggs, Dumfries, both of Scotland, assignors to Uniroyal Inc., Newbridge, Midlothian, Scotland

Filed Aug. 31, 1973, Ser. No. 393,359
Claims priority, application United Kingdom, Sept. 4, 1972, 40958/72
Int. Cl. E02b *15/04*
U.S. Cl. 61—1 F **8 Claims**



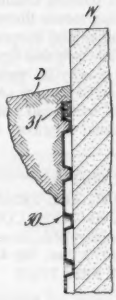
1. A multi-compartmented floating boom comprising a one-piece flexible sheet means folded over upon itself along the length thereof, a plurality of compartments defined by said one-piece sheet means, each compartment being isolated from another compartment through the intermediary of a pinched portion of said sheet means, each of said pinched portions including a flexible neck portion which is defined by at least one pair of sheet means portions which converge toward one another to a position wherein their corresponding opposed surfaces are adjacent to one another, means for sealing said corresponding opposed surfaces to one another along the length of each of said pinched portions, said plurality of compartments including a pollutant-barrier compartment means containing a stiffening medium, said pollutant-barrier compartment means having upper and lower longitudinally extending end portions, a pair of buoyant compartment means each containing a buoyant-inducing medium and disposed opposite one another along respective opposite faces of said pollutant-barrier compartment means, each of said buoyant compartment means being disposed intermediately between said upper and lower longitudinally extending end portions of said pollutant-barrier compartment means and isolated from the latter through the intermediary of respective ones of said pinched portions, and a ballast-inducing medium secured to said boom along the lower longitudinally extending end portion of said pollutant-barrier compartment means; whereby when said boom floats in the water said upper longitudinally extending end portion is disposed above the water surface and

said lower longitudinally extending end portion is disposed below the water surface to, thereby, contain floating debris.

3,888,087
FOUNDATION WALL PROTECTIVE SHEET

Jon Bergsland, Olso, Norway, assignor to Oivind Lorentzen Activities, Inc., New York, N.Y.

Filed Apr. 11, 1973, Ser. No. 350,280
Int. Cl. E02b *11/00;* **E02d** *31/02, 27/48*
U.S. Cl. 61—11 **2 Claims**

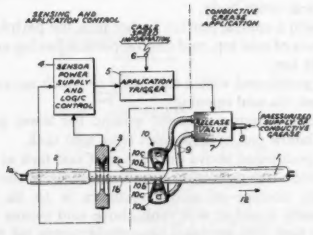


2. An imperforate sheet made of relatively thin stiff material for protecting foundation walls and the like, and including embossed protrusions on a front side thereof and comprising means for forming air channels between the wall and the sheet, said sheet including embossed ribs formed therein and extending from an edge of said sheet across said sheet and forming on said sheet channels for bending said sheet along the lengths of said ribs, said ribs extending from a top edge of said sheet downwardly and comprising channel means formed on the back side of said sheet for receiving water externally of said sheet, said ribs protruding forwardly a lesser distance than said protrusions, and a strip of porous material adhering along the top edge of said sheet on the front side thereof.

3,888,088
STABILIZING ATTENUATION OF A SEA WATER WIRE LINK

Harold F. Jarger, Rochelle Park, N.J., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Sept. 11, 1972, Ser. No. 287,956
Int. Cl. B44d *1/18*
U.S. Cl. 61—72.3 **2 Claims**

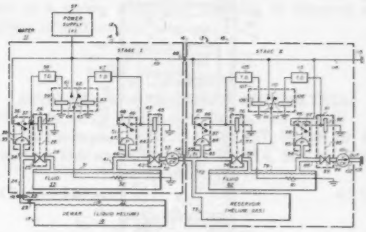


1. A method for providing a communications cable having a constant attenuation characteristic in sea water comprising:
a. providing a length of insulated communications cable;
b. applying a conductive grease to the outer surface of said cable;
c. connecting said conductive grease to an electrical ground; and
d. submerging said cable into the sea water.

3,888,089
VAPOR PRESSURE REGULATOR

Michael T. Cooper, Panama City, Fla., assignor to The United States of Amercia as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 11, 1974, Ser. No. 441,726
Int. Cl. F17c *7/02*
U.S. Cl. 62—50 **16 Claims**

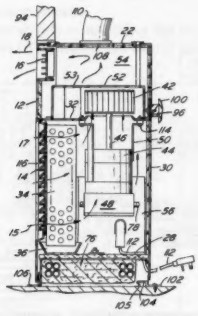


1. A vapor pressure regulator, comprising in combination:
means adapted for being connected to a container for receiving the vapor of a predetermined substance contained therein;
means, having an input and an output, adapted for containing a given liquid within a portion of the volume thereof;
a liquid, having a coefficient of expansion such that a volume thereof is increased with temperature and decreases with decreased temperature, disposed within said portion of the volume of the aforesaid containing means;
a first normally closed valve means, connected between the output of said receiving means and the input of said containing means, adapted for being opened in response to a first signal, so as to timely allow the aforesaid vapor to pass from said receiving means into that portion of said containing means not occupied by said given liquid and effectively in contact therewith;
a second normally closed valve means, having an input and an output, with the input thereof connected to the output of said containing means, adapted for being timely opened in response to a second signal, so as to timely allow the aforesaid vapor to pass out of said containing means;
means disposed in proximity with the aforesaid given liquid disposed within a portion of the volume of said containing means for the timely heating thereof in response to a third signal;
means connected to said receiving means and said first normally closed valve means for supplying said first signal thereto in response to a first vapor pressure within said receiving means and for removing said first signal therefrom in response to a second vapor pressure within said receiving means that is lower than said first vapor pressure;
means connected to the output of said containing means and said second normally closed valve means for supplying said second signal thereto in response to a third vapor pressure within said containing means and for removing said second signal therefrom in response to a fourth vapor pressure within said containing means that is lower than said third vapor pressure;
means connected to the output of said second normally closed valve means for exhausting the vapor from said container means whenever said second signal is supplied to said second normally closed valve means; and
means connected to said first and second signal supplying means and to said liquid heating means for supplying said third signal to said liquid heating means in accordance with a predetermined program and at such times that said first and second signals are not present at their respective first and second normally closed valve means.

3,888,090
AIR CONDITIONING APPARATUS

Eric A. Meyer, Furlong, Pa., assignor to Repco Products Corporation, Philadelphia, Pa.

Filed Dec. 26, 1973, Ser. No. 428,297
Int. Cl. B63b 25/26
U.S. Cl. 62—240 8 Claims

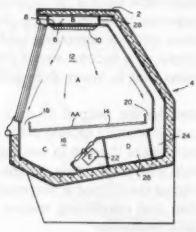


1. Compact air conditioning apparatus comprising a housing having an air inlet means and at least one air outlet means, an evaporator positioned in the housing adjacent the air inlet means for cooling air which enters the housing there through, an intermediate wall in said housing adjacent the upper end of said evaporator, said wall dividing the interior of said housing into an upper plenum discharge chamber and a lower cooling chamber containing said evaporator, said wall having an opening, air blower means in said plenum chamber with suction side adjacent to said opening so that the maximum air disturbances produced in the cooling chamber occur adjacent the top of said evaporator, motor means located in said cooling chamber adjacent said evaporator and below said opening for energizing said air blower, and said upper plenum chamber communicating with said outlet means.

3,888,091
AIR DISTRIBUTION MEANS FOR A REFRIGERATED MEAT CASE

Edward E. Butts, Niles, Mich., assignor to Clark Equipment Company, Buchanan, Mich.

Filed Apr. 4, 1974, Ser. No. 457,959
Int. Cl. A47f 3/04
U.S. Cl. 62—256 6 Claims

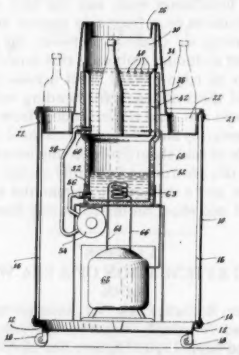


1. A refrigerated display case having a refrigerated space and including:
- a support for articles to be stored in said refrigerated space,
- a plenum chamber located above said support,
- a second plenum chamber located below said support,
- an air duct between said second plenum chamber and said first plenum chamber including therein,
- means for maintaining the air in said second plenum chamber at less than atmospheric pressure and maintaining the air in said first plenum chamber at greater than atmospheric pressure,
- cooling means located in said air duct capable of maintaining the temperature of said air in said first plenum chamber lower than the temperature of the air in said second plenum chamber,
- porous conductive means located between said first plenum chamber and said refrigerated space capable of restricting the flow of air so as to diffuse the air as it passes from said first plenum chamber to said refrigerated space,
- whereby air is exhausted from the lower portion of said space into said second plenum chamber and thereafter circulated by said cooling means through said air duct to said first plenum chamber and moved through said porous conductive material from said first plenum chamber into said space and by gravity through said space to said second plenum chamber, to thereby cause the circulation of cool air through said space and past said support in a manner substantially equal to gravity flow.

3,888,092
DEVICE FOR CHANGING THE TEMPERATURE OF CONTAINERS AND THEIR CONTENTS

James I. Fisher, 412 Longmeadow Rd., Orange, Conn. 06477

Filed Dec. 26, 1973, Ser. No. 427,680
Int. Cl. F83d 17/02
U.S. Cl. 62—376 8 Claims



1. Apparatus for cooling containers of material comprising a cylindrical outer body,
- a top with a central portion higher than the peripheral edge portion of said top, said central portion having an opening at the top,
- a tank positioned within said body to which access may be gained via said opening,
- receptacle means positioned around the lower portion of and below and spaced apart from said tank,
- means positioned above the bottom of said tank at that level at which it is desired to have the surface of the liquid by which cooling of said containers is to be effected, whereby liquid in said tank above said means may flow from said tank into said receptacle means via a duct,
- outlet means in the bottom region of said receptacle whereby water may flow from said receptacle means into a flow path including the inner path of flow of a pump by means of which liquid may be caused to travel to an inlet means positioned in that region of said tank which is below said egress means,
- and means for causing the temperature of said liquid to be lowered, which means includes a refrigerator means and a heat exchanger means,

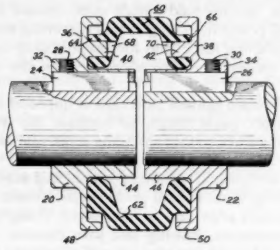
the liquid flow capacity of said egress means being greater than that of said flow path.

3,888,093

FLEXIBLE SHAFT COUPLING

Holmes A. Downey, Bremen, Ind., assignor to Reliance Electric Company, Mishawaka, Ind.

Filed Feb. 21, 1974, Ser. No. 444,277
Int. Cl. F16d *3/78*
U.S. Cl. 64—13 **8 Claims**



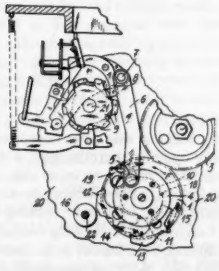
1. A flexible coupling for connecting two shafts in end-to-end relation, comprising a flange for each shaft, each flange having a hub for connection to a shaft, an annular radial portion connected to said hub and having an inner surface facing the opposite flange, a plurality of spaced pins projecting in an axial parallel direction from the inner surface of the radial portion, and a flexible torsional element of a generally U-shaped cross sectional configuration disposed between said flanges and having spaced, inwardly extending side walls, said side walls projecting laterally and having a plurality of holes in the laterally projecting portion for receiving the pins on the respective flange.

3,888,094

DRIVE UNIT FOR OPERATING AND CUTTING OUT THE ADDITIONAL THREAD SUPPLIES AND ASSOCIATED THREAD GUIDES ON DUAL CYLINDER CIRCULAR KNITTING MACHINES

Francesco Lonati, Brescia, Italy, assignor to Construzioni Meccaniche Lonati di Lonati Francesco & Figli (Ettore, Fausto, Tiberio)S.n.c., Brescia, Italy

Filed Jan. 7, 1974, Ser. No. 431,091
Claims priority, application Italy, Feb. 8, 1973, 5107/73
Int. Cl. D04b *15/54*
U.S. Cl. 66—138 **3 Claims**



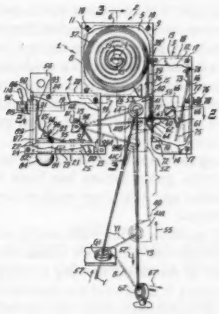
1. A drive unit for operating and cutting out the additional supplies and associated thread guides on dual cylinder, circular knitting machines, comprising a gear wheel rotably restrained to a wheelwork controlling said dual cylinder, and a disc idly carried on the shaft of said gear wheel, thereto being connected the small end of a connecting rod which in turn is restrained to a plurality of levers acting on a set of cam discs controlling the additional thread supplies and associated thread guides, wherein on said disc and connecting rod facing said gear wheel there is secured an annular element having at least one peripheral tooth, and on the face adjacent said gear wheel at least two driving rocking levers are pivoted, these levers being angularly spaced apart and selectively acting on said tooth of said annular element to restrain said annular element to said gear wheel, each of said levers being connected to a spring constantly retaining it adherent to the periphery of said annular element.

3,888,095

STOP MOTION ASSEMBLY AND METHOD

Morris Philip, 2519 Grand Ave., Bronx, N.Y. 10468

Continuation-in-part of Ser. No. 341,957, March 16, 1973, abandoned. This application Feb. 5, 1974, Ser. No. 440,138
Int. Cl. D04b *35/12*
U.S. Cl. 66—163 **41 Claims**



1. A method of controlling the stop motion control circuit of a knitting machine or the like when the normal yarn flow is undesirably impeded upstream of the vertex of a flexed reach of yarn traveling from an upstream yarn guide to an adjacent downstream guide by being drawn through the latter by said machine, said method comprising the steps of:

a. retaining and guiding said vertex with movable vertex guide means;

b. positioning said vertex guide means at a normal guiding position remote from the base line of said yarn guides so that drawing of the yarn against the drag of the yarn flowing upstream of said vertex guide means causes the vertex to exert an extending force acting on said vertex guide means urging said vertex guide means from said normal position toward said base line;

c. providing a retracting force generally opposed to said extending force continuously urging said vertex guide means, at least when said vertex guide means is away from said normal position, away from said base line toward said normal position, but preventing said retracting force from moving said vertex guide means past said normal position;

d. normally operating said machine to draw said yarn through said downstream guide and maintaining said vertex guide means in said normal position with normal yarn flow;

e. when said normal yarn flow is impeded upstream of said vertex guide means to a predetermined undesirable level, thereby increasing said extending force to an actuating level at least sufficiently high to exceed said retracting force, releasing said vertex guide means to permit said increased extending force to move said vertex guide means toward said base line;

f. actuating the stop motion control circuit of said machine at a time not prior to the time the extending force increases to said actuating level while permitting said extending force to continue moving said vertex guide means toward said base line, as said machine continues drawing said yarn because of machine inertia, until either said impediment self-eliminates or said machine stops drawing said yarn;

g. eliminating said impediment if it has not been self-eliminated, elimination of said impediment, by self-elimination or otherwise, reducing the extending force acting on said vertex guide means to a level below the level of said retracting force, to permit said retracting force to automatically return said vertex guide means to said normal position;

h. automatically deactuating said stop motion control circuit at a time subsequent to the time it was actuated;

i. continuously retaining and guiding said vertex with said vertex guide means throughout the foregoing steps to maintain said yarn reach taut;

j. maintaining a continuous connection between said vertex guide means and a reference connection location on a support throughout said vertex guide means movement, said connection being lengthened in the general direction of said extending force during movement of the vertex guide means in one of said vertex guide means movement directions and being shortened in the general direction of said retracting force during movement of the vertex guide means in the other of said vertex guide means movement directions;

k. and restarting said machine, to resume normal operation, after said vertex guide means has been returned to said normal position and said stop motion control circuit has been deactuated;

l. said normal position being sufficiently remote from said base line to provide adequate distance for said vertex guide means to continue moving toward said base line without reaching it until said machine stops drawing said yarn without self-elimination of the impediment after actuation of said stop motion control circuit.

15. A stop motion assembly for use with a stop motion control circuit of a knitting machine or the like for actuating said stop motion control circuit when the normal yarn flow is undesirably impeded upstream of the vertex of a flexed reach of yarn traveling from an upstream yarn guide to an adjacent downstream yarn guide by being drawn through the latter by said machine, said machine continuing to draw said yarn after actuation of the stop motion control circuit because of machine inertia, said assembly comprising:

a. a support;

b. movable vertex guide means for retaining and guiding the vertex of said reach of traveling yarn throughout the movement of said vertex guide means;

c. mounting means for mounting said vertex guide means on said support for longitudinal reciprocating movement between a normal guiding position and a terminal guiding position and for providing at least a portion of a continuous longitudinally lengthenable-shortenable connection between said vertex guide means and a reference location on said support throughout said vertex guide means movement;

d. means providing a retracting force continuously urging said vertex guide means, at least when said vertex guide means is away from said normal position, away from said terminal position toward said normal position;

e. said vertex guide means being movable from said normal position toward said terminal position by an extending force exerted by said vertex, generally opposed to said retracting force, when the level of said extending force reaches an actuating level at least sufficiently high to exceed said retracting force, said retracting force automatically returning said vertex guide means to said normal position when said retracting force exceeds said extending force and said vertex guide means is away from said normal position;

f. means preventing said retracting force from moving said vertex guide means past said normal position;

g. switch means for actuating said stop motion control circuit, said circuit being actuated when said switch means is closed and being non-actuated when said switch means is open, said switch means being normally open;

h. means for connecting said switch means to the stop motion control circuit of said machine;

i. and sensor means for closing said switch means at a time not prior to the time said extending force increases to said actuating level while permitting said extending force to continue moving said vertex guide means toward said terminal position, as long as said extending force exceeds said retracting force, and for automatically opening said switch means at a time subsequent to the time it was closed;

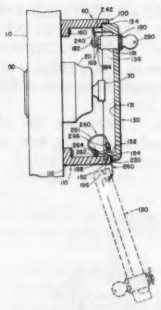
j. whereby when normal yarn flow is impeded upstream of said vertex guide means to increase the level of said extending force to said actuating level, said switch means is closed and said extending force moves said vertex guide means toward said terminal position, said extending force continuing to move said guide means toward said terminal position after said switch means closes as said machine continues drawing said yarn because of machine inertia until said impediment self-eliminates or said machine stops drawing said yarn, and when said impediment is eliminated, by self-elimination or otherwise, to reduce the extending force to a level below the level of said retracting force, said retracting force automatically returns said vertex guide means guiding said vertex to said normal position, said switch means automatically opening at a time subsequent to the time it was closed.

3,888,096

LOCK-UP HOUSING FOR DOOR LOCK

Steven J. Huss, 2311 S. 8th St., Omaha, Nebr. 68108

Filed June 4, 1973, Ser. No. 366,297
Int. Cl. E05b *13/00*
U.S. Cl. 70—209 **4 Claims**



1. A doorway locking assembly comprising a door jamb having a doorway opening therethrough, a door in said doorway opening, said door having an inner side disposed substantially in a vertical plane, a door locking device mounted on the inner side of said door, said door locking device having a manipulatable locking and unlocking control means thereon extending in a direction outwardly from one side of said door, a lock-up housing unit, said unit comprising: a base having an opening means therethrough receiving at least a portion of said locking device and said control means being inside of said housing unit and guarded by said housing unit, means securing said base to said door, a lid, a lid-lock in said housing, said lid-lock being operable to lock said lid to said base and to unlock said lid from said base, said lid-lock being controllable

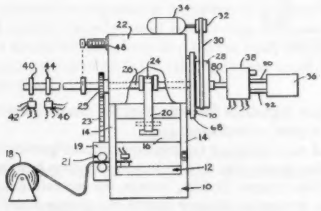
from the outside of said housing unit, said lid and said base and said lid-lock forming an enclosing assembly which latter sufficiently encloses said control means that a thief cannot manipulate said control means from the lid side of said unit without removing said lid, said lid being removably attached to said base for movement away from said base when said lid-lock is unlocked, said lid being sufficiently large that when said lid is removed from said base this will give an operator sufficient access to said control means to manually operate said control means, that side of said base which faces said door defining a forward side of said base, said lid extending across the rearward side of said base, said lid fitting inside of said base and lapping said base for making it difficult for a thief to insert a prying tool in the space between said lid and said base, said lid and base forming a pair of closure members, one side of at least one of said closure members having both a certain groove means therein and having a certain ridge means thereon, said certain ridge means being disposed exteriorly on its closure member of the groove means of its closure member, the other closure having a groove means removably receiving the ridge means of said one closure member, said one closure member having a wall thickness on an opposite side of its groove from its ridge which latter wall thickness is equal to the wall thickness at its said ridge.

3,888,097

MACHINE HAVING A DRIVE SHAFT AND A METHOD OF OPERATION

Ronald F. Fortman, Fort Loramie, and John E. Voorhees, Sidney, both of Ohio, assignors to The Minster Machine Company, Minster, Ohio

Filed Apr. 11, 1974, Ser. No. 460,217
Int. Cl. B21j *9/20*
U.S. Cl. 72—26 **19 Claims**



1. The method of operating a machine having a frame with a shaft and a driving member rotatable therein so as to halt the shaft near a predetermined first rotated position when the shaft must be stopped from rotation at either high or low speed, said method comprising; clutching the shaft to the driving member to drive the shaft, applying a brake to the shaft at a predetermined second rotated position thereof with the clutch released to halt the shaft near said first rotated position, and when the shaft is rotating above a predetermined speed applying the brake while releasing the clutch to slow the shaft down to near said predetermined speed, and then releasing the brake to permit the shaft to coast to said second predetermined rotated position and then again applying said brake to the shaft.

3,888,098

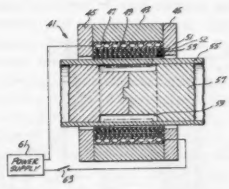
LIQUID METAL CORE TRANSPACTOR ELEMENTS FOR ELECTROMAGNETIC FORMING TOOLS

Walter H. Larrimer, Jr., Bellevue, and Donald L. Duncan, Seattle, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Feb. 27, 1974, Ser. No. 446,491
Int. Cl. B21d *26/14*
U.S. Cl. 72—56 **22 Claims**

1. A transpactor element suitable for use in an electromagnetic forming tool of the type wherein an electromagnetic coil lies adjacent to the transpactor element and the transpactor element creates a deforming force in response to the interaction between an electrical current induced in the transpactor element by the electromagnetic coil and the magnetic field generated by the electromagnetic coil, said transpactor element comprising:

an elastomeric member formed of an elastomeric material, said elastomeric member including an entirely enclosed internal cavity defined by at least a pair of walls spaced relatively close to one another; and,



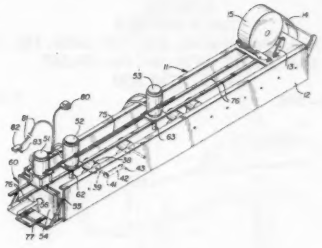
a liquid metal core located in said internal cavity in said elastomeric member, said liquid metal core formed of a solid body comprising a low melting point alloy having a melting point above room temperature and electrical characteristics such that electrical currents are induced therein when said liquid metal core is in the presence of an externally generated magnetic field, said low melting point alloy comprising at least two metals selected from the group consisting of cadmium, indium, bismuth, lead and tin.

3,888,099

METAL STUD AND TRACK FORMER

Jeral D. Allen, Denver, Colo., assignor to Watertite Industries, Inc., Denver, Colo.

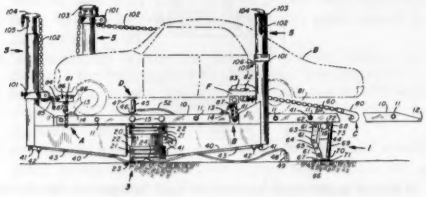
Filed Nov. 27, 1973, Ser. No. 419,308
Int. Cl. B21f *11/00*
U.S. Cl. 72—129 **9 Claims**



1. A portable roll forming machine for the fabrication of structural channel sections from coil strip materials wherein at least two of the channel sections formed by said machine are to be of different width comprising a plurality of pass roll stands in circuit arrangement one after another, an intermediate roll stand having mating top and bottom rolls adapted to provide flange related initial radius bends at laterally spaced bend lines whereby the flanges of either channel section are moved to a position that is normal with respect to the web of such section with the flanges of each section being disposed apart the same distance, and a following roll stand disposed in operative position after said intermediate stand having mating top and bottom rolls adapted to selectively reduce the radius of said initial flange related bends and to laterally move the flanges for channel sections worked by said following roll stand whereby the flanges of such worked channel sections are adapted for close interfitting engagement with the flanges of

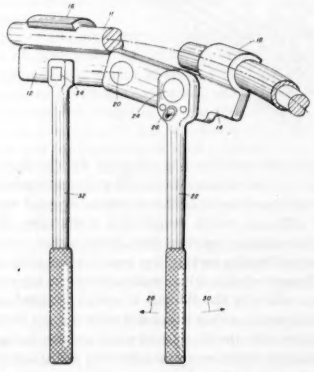
channel sections passing only through said intermediate roll stand.

3,888,100
AUTO BODY AND FRAME STRAIGHTENING DEVICES
Finis L. Chisum, 1113 W. 16th, Claremore, Okla. 74107
Continuation-in-part of Ser. No. 810,940, March 27, 1969, Pat. No. 3,630,066. This application Dec. 23, 1971, Ser. No. 211,527
Int. Cl. B21d *1/12*
U.S. Cl. 72—305 **36 Claims**



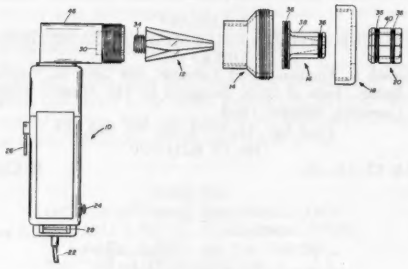
1. Apparatus for applying equal and opposite forces to a mechanical structure such as an automotive vehicle body or frame comprising:
a. a platform system;
b. means on said platform system for supporting said structure;
c. at least one vertical pull tower means pivotally connected about a vertical axis fixed to said platform system notatably movable to a desired position relative to said structure;
d. means to vertically elongate said tower;
e. means to connect a tension member between said vertically elongate means and a first portion of said structure to apply a first force to said structure; and
f. means to apply a second force between a second portion of said structure and said platform system.

3,888,101
CABLE BENDER
Silas Ray Crees, 1649 Avocado Ave., Eau Gallie, Fla. 32935
Filed Jan. 17, 1974, Ser. No. 434,365
Int. Cl. B21d *7/00*
U.S. Cl. 72—388 **7 Claims**



1. A cable bender comprising:
a first bending member;
a second bending member rotatably joined to the first bending member about a common pivot axis;
two cable shoes, each joined to one of said bending members for holding cable to be bent across said bending members;
a first lever fixed to said first bending member at a point spaced outwardly from said pivot axis;
a second lever joined to said second bending member at a point spaced outwardly from said pivot axis;
means for fixing said second lever in a set position when rotational force is applied in one direction, said means further allowing said lever to rotate freely when rotational force is applied in a direction opposite to said one direction; and wherein
an imaginary line between each said point and said pivot axis is substantially parallel with cable held by said shoes and which is to be bent.

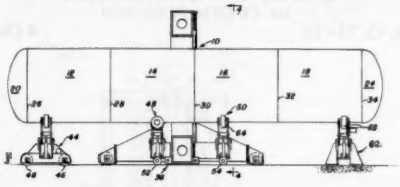
3,888,102
SWEDGER APPARATUS
Salvatore A. Nigido, 141 Fairmount Dr., Belair, Md. 21014
Continuation of Ser. No. 295,865, Oct. 10, 1972, abandoned. This application Apr. 8, 1974, Ser. No. 458,732
Int. Cl. B21d *41/02*
U.S. Cl. 72—393 **1 Claim**



1. Swedger apparatus for enlarging the inner diameter and surface of a pipe, comprising:
a tapered ram having a frustro-conical configuration;
an impulse producing device having a pump housing with hydraulic means therein, means for actuating said hydraulic means, a plunger within the pump housing and engageable at one end with said ram, said hydraulic means forcing the plunger and said ram toward the end opening of a pipe to be enlarged;
housing means attachable to said impulse producing device and housing the ram substantially therein, the housing means having an outer end portion;
cap means attachable to the outer end portion of the housing means and having a centrally disposed aperture therein; and,
expander means for engagement with the interior surface of a pipe to be enlarged, said expander means being disposed in the aperture in said cap means and having a central tapered cavity for receiving at least a portion of the ram centrally therein, the expander means including a plurality of segments of frustro-conical configuration circumferentially arranged for radial movement wherein the surface of the ram engages the inner surfaces of the segments to force said segments in a radial direction and against the inner surface of the pipe on movement of the ram in a direction coincident with the longitudinal axes of the pipe and toward the open end thereof, the segments of the expander means further having flange-like inner end portions which are disposed within the housing means and abut, on forwardly disposed surfaces of said portions, portions of the interior surface of the cap means, movement of the ram to a predetermined degree for causing radial expansion of the segments acting to cause outer perimetric portions of the flange-like inner

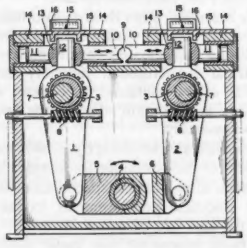
end portions to abut against the interior surface of the outer end portion of the housing means, and an adapter ring mountable on the expander means externally of the housing means and cap means and including a plurality of segments circumferentially arranged for radial movement against the interior surface of the pipe on radial movement of the plurality of segments comprising the expander means.

3,888,103
FORMING APPARATUS
Robin Renshaw, 344 Fairview Ave., West Chicago, Ill.
Filed Jan. 25, 1971, Ser. No. 109,206
Int. Cl. B21d *7/03*
U.S. Cl. 72—399 **10 Claims**



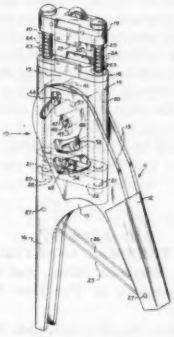
1. Forming apparatus comprising a source of hydraulic fluid under pressure, a master cylinder, including a plunger, a plurality of slave cylinders, a first conduit means connecting said source to said master cylinder, said plunger means connecting said master cylinder to said slave cylinders, a hydraulic jack fluidly connected to each of said slave cylinders, said jacks being operable in response to actuation of said slave cylinders by said master cylinder, said jacks being disposed in spaced relation about the periphery of a hollow body and being operable upon actuation to form said body into a predetermined configuration.

3,888,104
FORGING MACHINE
Bernd Ribback, Rue de Mertert 48, Wasserbilling/Lux., Germany
Filed Jan. 7, 1974, Ser. No. 431,470
Claims priority, application Germany, Jan. 12, 1973, 2301537
Int. Cl. B21j *9/18*
U.S. Cl. 72—407 **5 Claims**



1. A forging machine for providing linear movements for at least two forging tools along a common forging axis, despite arcuate movements of the associated drive, the machine comprising: two double-arm levers pivotably disposed adjacent one another and having respective pivot axes, for actuating the tools; linear displacement means for coupling the tools to outer arms of said levers, and for guiding the tools in areas that are laterally within the forging axis, so that the tools reciprocate linearly therealong; the tools having respective carriers coaxially aligned on the forging axis for linearly moving the tools into respective operative positions; said linear displacement means including coupling trunnions formed on said outer lever arms, having extensions substantially perpendicular to those of the respective carriers, bushings partly rotatable in said carriers and axially engaged by said trunnions for pivotably mounting and supporting said carriers, said bushings having bores therein for slidably journaling said trunnions, and cylindrical guides disposed laterally with respect to the forging axis and mounted coaxially opposite one another, for linearly guiding terminal portions of said carriers as well as the tools by the intermediary of said bushings, for linear reciprocation along the forging axis; said drive for the tools including two pressure-element levers pivotable about a central, eccentric drive shaft and pivotably connected to other lever arms, opposite said terminal portions of the carriers, for imparting reciprocatory arcuate movements to said levers; and wherein said trunnions of the linear displacement means provide compensation between the arcuate movements of said outer lever arms and the linear movements of said carriers.

3,888,105
TOGGLE CRIMPER
Silas E. Bert, Camp Hill, Pa., assignor to E. I. du Pont de Nemours & Company, Wilmington, Del.
Filed Oct. 15, 1973, Ser. No. 406,144
Int. Cl. B21d *37/12*
U.S. Cl. 72—410 **15 Claims**

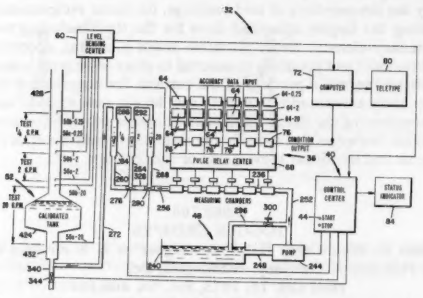


1. A hand-operated device for performing an operation by tooling carried thereby on a work piece or other object, said device comprising a pair of operating handle members operatively connected and manually actuated for movement relative to one another in two distinct repeated strokes thereof, thus to effect said operation of said tooling on the work piece, and a mechanical force-transmitting unit operated by said members, in two phases of action of the unit which correspond respectively to said two repeated strokes, to cause said tooling to perform its operation on said work piece, said force transmitting unit comprising a double linkage including a pair of toggle linkage sets, means pivotally articulating said sets with one another, means successively actuated by said operating members in said repeated strokes thereof to alter the length of one of said pair of toggle linkage sets during a first phase of action of said unit and to alter the length of the other of said pair of toggle linkage sets during a second phase of action of said unit.

3,888,106
TESTING APPARATUS FOR FLOW MEASURING DEVICES

Bernard Last; Eugene M. Weinberger, both of Uniontown; James R. Gray, Farmington; George W. Clements, Uniontown, and Ralph E. Deffenbaugh, Uniontown, all of Pa., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Filed Mar. 7, 1973, Ser. No. 338,651
Int. Cl. G01f *25/00*
U.S. Cl. 73—3 **17 Claims**

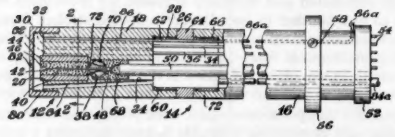


1. Apparatus for determining whether the accuracy of a flow measuring device is within acceptable limits, comprising a reservoir, means for pumping the test liquid from said reservoir through the flow measuring device being tested, means for collecting the fluid after it is displaced through the measuring device, means having an output indicative of the flow through the flow measuring device as measured by said device, means for comparing the measured flow with the volume of test fluid that is collected, a bypass from the discharge side of said pumping means to said reservoir and a pressure responsive valve in said bypass for maintaining the pressure on the discharge side of the pumping means constant, and means for changing the resistance to the flow of the test liquid on the downstream side of the flow measuring device to alter the rate-of-flow of the test fluid through the flow measuring device.

3,888,107
DIFFERENTIAL THERMAL ANALYSIS CELL ASSEMBLY

Horst G. Langer, Wayland, Mass., and Earl D. Ayers, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 871,517, Oct. 8, 1969, abandoned, which is a continuation-in-part of Ser. No. 856,396, Sept. 9, 1969, abandoned. This application Aug. 2, 1972, Ser. No. 277,236
Int. Cl. G01n *25/00*
U.S. Cl. 73—15 B **5 Claims**

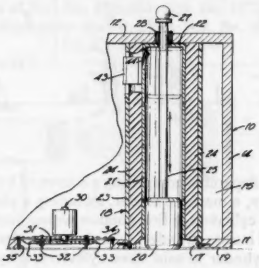


1. A differential thermal analysis cell assembly adapted to be inserted into and removed from a high vacuum part of an analytical instrument, comprising an elongated cell section made of a block of highly thermally conductive metal having side walls and a forward end part, said forward end part having a sample receiving bore therein, temperature sensing means for measuring the temperature of any material in said sample receiving bore, means for sensing the temperature of at least one other part of said block, end capping means coupled to and spaced from said forward end part, said end capping means and said forward end part defining a substantially enclosed space surrounding said sample receiving bore, said end capping means having an aperture extending therethrough, said aperture providing a gas leakage path into said high vacuum part of said instrument, and tubular passage means extending through said block and communicating with said substantially enclosed space for withdrawing gases from said substantially enclosed space.

3,888,108
PAVEMENT TESTING APPARATUS

Frank W. Brands, Rte. 2, Box 429, Pullman, Wash. 99163

Filed Aug. 2, 1973, Ser. No. 385,181
Int. Cl. G01n *29/00, 3/00*
U.S. Cl. 73—12 **4 Claims**



1. An apparatus for testing pavement structural condition, comprising;

an enclosed container adpated to be hand-carried, said container including vertically spaced top and bottom walls bounded by enclosing upright walls, said bottom wall being adapted to rest upon the surface of the pavement portion being tested:

a vertical guide tube assembly mounted within the container and extending along a vertical axis between said top and bottom walls, the bottom wall having an aperture formed therethrough across the lower end of the guide tube assembly;

a vertical hammer slidably mounted within the guide tube for gravitational movement through said aperture along said axis from a raised position in the guide tube assembly, to impact the pavement surface;

an upwardly extending stem fixed to said hammer and protruding through the top wall of the container to permit manual raising and release of the hammer;

a first electrical accelerometer yieldably mounted on the bottom wall of the container for contact with the pavement surface at a location adjacent the aperture for said guide tube assembly;

a second electrical accelerometer yieldably mounted on the bottom wall of the container for contact with the pavement surface at a location spaced from the location of said first electrical accelerometer to the side thereof opposite the aperture of said guide tube;

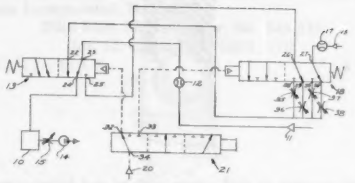
hammer sensing means on said guide tube assembly for detecting the presence of said hammer at its raised position;

and gated signal means operatively connected to said first and second electrical accelerometers and actuable in response to said hammer sensing means upon initial release of the hammer to monitor the electrical signals from said accelerometers during a preset time duration sufficient to assure impact of the pavement surface by said hammer.

3,888,109
GAS DILUTION UNIT

Martin James Sharki, and Clell D. Miller, both of Houston, Tex., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Nov. 16, 1973, Ser. No. 416,532
Int. Cl.[2] G01N 31/00
U.S. Cl. 73—23 4 Claims



1. Apparatus for analyzing a sample gas that will provide analysis of said sample gas under conditions wherein the concentration of said sample gas may be above the range of known measuring devices, comprising:

measuring means for determining at least one characteristic of said sample gas,

a source of diluting gas,

a first flow control valve for providing flow at a first rate,

a second flow control valve for providing flow at a second rate, said second rate being related to said first rate by a first ratio,

a third flow control valve for providing flow at a third rate,

a fourth flow control valve for providing flow at a fourth rate, said fourth rate being related to said third rate by a second ratio and said second ratio being different than said first ratio,

a first valve having a first inlet port for receiving said sample gas, a second inlet port connected to said source of diluting gas, a first outlet port connected to said first flow control valve, a second outlet port connected to said second flow control valve, a third outlet port connected to said third flow control valve, and a fourth outlet port connected to said fourth flow control valve, for directing said sample gas from said first inlet port to said first outlet port and said first flow control valve and directing said diluting gas from said second inlet port to said second outlet port and said second flow control valve in a first position; and directing said sample gas from said first inlet port to said third outlet port and said third flow control valve and directing said diluting gas from said second inlet port to said fourth outlet port and said fourth flow control valve in a second position,

means for combining said sample gas from said first control valve and said diluting gas from said second control valve and transmitting said combined gases to said measuring means;

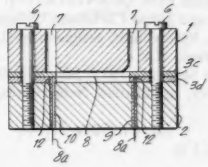
means for combining said sample gas from said third flow control valve and said diluting gas from said fourth control valve and transmitting said combined gases to said measuring means,

means for selectively moving said first valve to said first position and to said second position, a second valve for directing said sample gas to said first inlet port of said first valve in a first position and directing said sample gas directly to said measuring means in a second position, and means for selectively moving said second valve to said first position and to said second position.

3,888,110
APPARATUS FOR THE DETERMINATION OF THE THERMAL CONDUCTIVITY OF GASES

Anthony John Clark, 19, Crossways, Onslow Village, Guildford, Surrey, England

Continuation-in-part of Ser. No. 397,578, Sept. 18, 1964, abandoned. This application Nov. 3, 1967, Ser. No. 680,477
Claims priority, application United Kingdom, Dec. 14, 1966, 55959/66
Int. Cl. G01n 31/00
U.S. Cl. 73—27 13 Claims

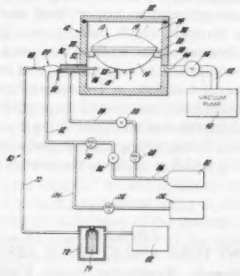


1. Apparatus for use in the determination of the thermal conductivity of gases comprising two blocks of a thermally conductive material having inlet and outlet passages, the axes of said passages being offset from one another, a perforated gasket which separates the blocks of thermally conductive material and defines with the blocks an enclosed cell having inlet and outlet ports communicating with said passages, substantially the total gas volume space of the cell lying within the thickness of the gasket at least one electrically heated detector element supported within said cell and means for making electrical connections to said detector element from outside of said blocks the perforated gasket and detector elements being constructed substantially as one single readily replaceable unit and the volume of the enclosed cell is so small as to permit analysis of gases separated on a capillary chromatographic column without significant loss of resolution.

3,888,111
SEALED BEAM HEADLAMP UNIT LEAK DETECTION SYSTEM

Gale M. Craig, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 21, 1973, Ser. No. 417,792
Int. Cl. G01m 3/00
U.S. Cl. 73—40.7 3 Claims



1. A method of detecting leakage in a lamp unit having a gas fill including helium, comprising the steps of: placing the lamp unit in a sealed chamber; evacuating the chamber to draw said gas fill through any leakage paths in the unit; filling the chamber with carbon dioxide to atmospheric pressure; inserting a

probe into said chamber while maintaining said filling with carbon dioxide; shielding the probe with carbon dioxide to prevent atmospheric contamination thereof; connecting said probe to a device for detecting the presence of helium; drawing the contents of the chamber to draw thereinto; condensing the carbon dioxide of said contents prior to said device; conveying said contents including any leaked gas fill less said carbon dioxide to said device such that only the leaked gas fill is presented to the device for detection of the leaked helium.

3,888,112

APPARATUS FOR QUANTITATIVE ANALYSIS

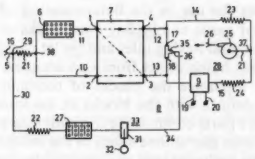
Paul De Leeuw, and Johan Christiaan Willem Kruishoop, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 28, 1973, Ser. No. 401,850

Claims priority, application Netherlands, Oct. 11, 1972, 7213711

Int. Cl. G01n *27/50*

U.S. Cl. 73—61.1 R **5 Claims**



1. An apparatus for the analysis of constituents of a fluid of the type comprising a measuring cell having an inlet and a discharge outlet connected to a discharge flow means; inlet means for supplying a fluid stream to be tested; means connected to said inlet means for filtering at least a portion of said fluid stream; calibration means for adding a known concentration of source fluid to a carrier fluid, said carrier fluid being at least a portion of said fluid stream; and interconnection means for supplying the inlet of said measuring cell alternatively with fluid filtered by said filtering means, unfiltered fluid, or calibrating fluid, said calibrating fluid comprising at least carrier fluid and source fluid from said calibration means; wherein said apparatus comprises a main flow resistance so connected that flow of the fluid stream causes a pressure drop between said inlet means and the inlet of said measuring cell; said calibration means comprises branch means connected between said inlet means and said main flow resistance for supplying a portion of the fluid stream to the calibration means to serve as carrier fluid; and a calibration flow resistance through which said carrier fluid flows for controlling the amount of carrier fluid flow; and said interconnection means comprises an interconnection valve having at least first and second outlets, a T-member having a leg and two sides, the sides being connected respectively to said first and second outlets, the second outlet being connected to said calibration means for receiving carrier and source fluid, and means connecting said first outlet to the inlet of the measuring cell.

3,888,113

REAGENT TUBE AND STOPPER ASSEMBLY

Eduardo V. Miranda, Huntington Beach, Calif., assignor to Baxter Laboratories, Inc., Morton Grove, Ill.

Filed Oct. 3, 1973, Ser. No. 402,951

Int. Cl. G01n *11/12, 33/16*

U.S. Cl. 73—64.1 **7 Claims**

1. A reagent tube and stopper assembly comprising in combination a receptacle for containing a reagent solution and a flexible stopper for closure thereof and dispensing a spherical member into said reagent solution, said receptacle having a mouth and an elongated cylindrical wall, said flexible stopper having upper and lower surfaces, a generally cylindrical outer surface and upper and lower cavities, said lower cavity being generally spherical and having a downwardly disposed opening at said lower surface with a width less than the diameter of said spherical cavity, said upper cavity having an upwardly

disposed opening at said upper surface and being separated from said lower cavity by a thin, flexible membrane, said outer surface being adapted for snug positioning within the inner cylindrical surface of the upper portion of said receptacle, said spherical cavity being adapted for holding a sphere having a diameter slightly less than the diameter of said receptacle.

3,888,114

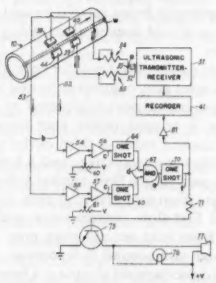
VERIFICATION MEANS FOR SHEAR WAVE ULTRASONIC INSPECTION SYSTEM

David O. Adams, Jr., and John H. Skaggs, both of Houston, Tex., assignors to AMF Incorporated, White Plains, N.Y.

Filed Mar. 6, 1974, Ser. No. 448,574

Int. Cl. G01n *29/04*

U.S. Cl. 73—67.8 R **10 Claims**



1. In an ultrasonic inspection system for inspecting a member capable of propagating ultrasonic energy, means for monitoring the operation of the system comprising

a plurality of pairs of ultrasonic transducers,

the transducers of each pair being positioned on opposite sides of a zone of the member to be inspected and arranged to provide an ultrasonic energy propagation path therebetween which passes through said zone,

said pairs of transducers being arranged relative to the zone so that all of the lengths of the propagation paths between pairs of transducers are substantially equal,

means for simultaneously energizing one transducer of each of said pairs for simultaneously directing ultrasonic energy along each of said propagation paths and through said zone,

means coupled to the other transducer of each of said pairs for producing a first output signal only when all of said

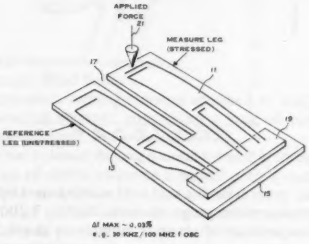
other transducers are simultaneously energized by ultrasonic energy received in their respective propagation paths and for producing a second output signal only when said other transducers are not so simultaneously energized, and

indicating means operable in response to the occurrence of said second output signal.

3,888,115
STRAIN SENSOR

Robert J. Schwartz, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 30, 1973, Ser. No. 346,516
Int. Cl. G01b 7/16; G01l 1/10
U.S. Cl. 73—88.5 R **4 Claims**



1. A strain sensor comprising:

a. a first surface wave device deposited on a first substrate, first means connecting said first surface wave device into a first oscillator circuit oscillating within a first predetermined frequency range,

b. a second surface wave device deposited on a second substrate, second means connecting said second surface wave device into a second oscillator circuit oscillating within a second predetermined frequency range, said first substrate having no deliberate mechanical force applied thereto,

c. means for inducing a deliberate mechanical strain in said second substrate to alter the frequency of oscillation of said second oscillator circuit, and

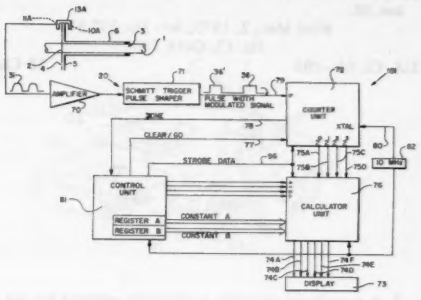
d. means for comparing the frequency of oscillation of said first and second oscillators to indicate the change in frequency of said second oscillator resulting from the application of deliberate strain in its substrate.

3,888,116
DIGITAL TORQUEMETER AND THE LIKE

Rinaldo A. Spinella, Cambridge, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Oct. 11, 1973, Ser. No. 405,573
Int. Cl. G01l 3/12
U.S. Cl. 73—136 A **6 Claims**

1. Apparatus for measuring torque transmitted by a rotating shaft that comprises, in combination, means for producing a pulse width modulated signal as a train of electric pulses, digital processing means to receive the signal and to relate the pulse width to the transmitted torque, said digital processing means including a first counter, a second counter, means to establish a given period of shaft rotation, a high frequency clock having very small variance connected as one input to the gating logic of each counter, the signal being connected as a further input to the gating logic of the first counter, the means to establish said given period having an electric output that is connected as a further input to the gating logic of each counter, calculator means connected to receive as input the outputs of both the first counter and the second counter and adapted to provide as output a number representing torque, and controller means to coordinate the functioning of the second counter, the means to establish said given period, and

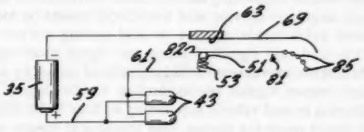


the calculation process for the numerical value of transmitted torque.

3,888,117
PRESSURE SENSOR AND INSTRUMENT UTILIZING SAME

Warren F. Lewis, Goleta, Calif., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed July 16, 1973, Ser. No. 379,776
Int. Cl. G01l 5/00
U.S. Cl. 73—141 A **22 Claims**



1. A pressure indicating instrument comprising:

a pressure sensor including first and second conductors and a compressible insulator interposed between said conductors, said insulator normally holding said conductors out of electrical contact;

said insulator being compressible in response to a compressive pressure tending to bring the first and second conductors closer together;

at least a portion of at least one of said first and second conductors being adapted to contact the other of said first and second conductors in response to a predetermined amount of compression of said insulator, said predetermined amount of compression of said insulator corresponding to a predetermined magnitude of the compressive pressure on said pressure sensor;

indicator means coupled to said pressure sensor and being responsive to said conductors being in electrical contact for providing an indication of the presence or absence of said predetermined magnitude of the compressive pressure on said pressure sensor;

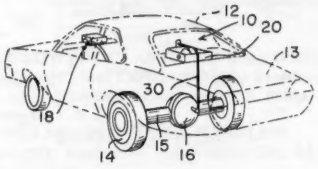
testing means disposed relative to the first and second conductors and being operable to enable the indicator means to provide the indication even when the insulator is not compressed; and

said pressure sensor including a flexible jacket having a surface with non-stick characteristics, said jacket enclosing at least substantial sections of said conductors and said insulator, said compressive pressure being transmittable to said insulator through said flexible jacket.

3,888,118
METHOD AND APPARATUS FOR DETERMINING ROAD ROUGHNESS

Jerry R. Nims, Baraboo, Wis., assignor to Soiltest, Inc., Evanston, Ill.

Filed Mar. 2, 1973, Ser. No. 337,544
Int. Cl. G01b 5/28
U.S. Cl. 73—105 15 Claims



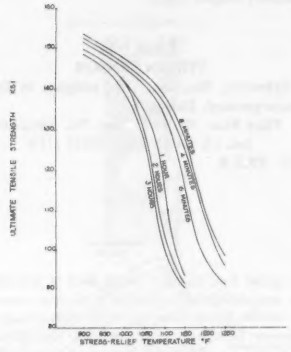
1. A transducer assembly particularly adapted for use in a road roughness meter to translate deflections sensed in a vehicle supporting surface to signals indicating road roughness including axial means mounted on the sprung portion of a vehicle constructed for travel over said supporting surface, said axial means being angularly movable with respect to said sprung portion, transducer means mounted on said axial means and movable therewith, signal emitting and signal receiving means disposed adjacent said transducer means, drive means operatively engaging at least a portion of said transducer means, said drive means being connected to the unsprung portion of said vehicle at one end thereof, and being connected through resilient means to the sprung portion of said vehicle at the opposite end thereof, said drive means being moved with respect to the sprung portion of said vehicle as said unsprung portion moves in response to the deflections in the vehicle supporting surface, such movement of said drive means angularly moving said transducer means on movement of said axial means relative to said sprung portion of said vehicle and said signal emitting and signal receiving means such that the movement of said transducer means by said drive means causes signals corresponding to the degree of each deflection in said vehicle supporting surface to be received by said signal receiving means, said transducer means including an encoded wheel means mounted on said axial means and angularly movable therewith, said wheel means having a plurality of coded openings formed therein corresponding to measureable increments of possible deflections in said vehicle supporting surface, said encoded wheel means being interposed between said signal emitting means and said signal receiving means, said encoded wheel means also having a series of aligning openings formed therein, said aligning openings being smaller in dimension than said coded openings and being disposed in spaced relationship near the perimeter of said wheel means such that angular movement of said wheel means to allow a signal to be passed from said signal emitting means through one of said aligning openings in said wheel means to said signal receiving means will assure that various desired coded openings are in centered alignment between said signal emitting means and signal receiving means.

3,888,119
PROCESS FOR COLD-WORKING AND STRESS-RELIEVING NON-HEAT HARDENABLE FERRITIC STAINLESS STEELS

Harry Tanczyn, Baltimore, Md., assignor to Armco Steel Corporation, Middletown, Ohio

Filed Jan. 18, 1974, Ser. No. 434,397
Int. Cl. B21c 9/00
U.S. Cl. 72—364 7 Claims

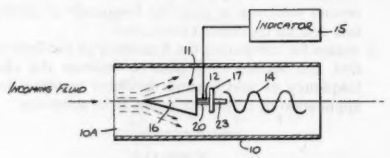
1. A process for increasing the ultimate tensile strength of non-heat hardenable ferritic stainless steel bar, rod, wire, strip and special shapes while retaining good ductility therein, comprising the steps of cold working a non-heat hardenable ferritic stainless steel containing from about 11% to about 30% chromium and balance substantially iron by passage through a die peripherally contacting said steel, said cold working effecting a reduction in thickness sufficient to increase the ultimate tensile strength of said steel by at least about 50 ksi, stress relieving said cold worked steel by heating within the temperature range of about 750° to 1,200° F with a time at temperature of about 2 minutes to about 3 hours, whereby to obtain an elongation value adequate to permit subsequent cold forming operations.



3,888,120
VORTEX TYPE FLOWMETER WITH STRAIN GAUGE SENSOR

Thomas H. Burgess, Horsham, Pa., assignor to Fischer and Porter Co., Warminster, Pa.

Filed Apr. 26, 1973, Ser. No. 354,803
Int. Cl. G01f 1/00; G01p 5/00
U.S. Cl. 73—194 B 8 Claims



1. A flowmeter of the vortex type comprising:

A. a flow conduit through which fluid to be measured is conducted;

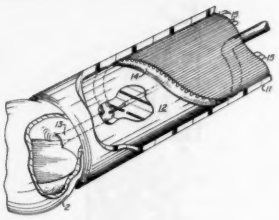
B. an obstacle assembly disposed within said conduit and constituted by a front section fixedly mounted across the conduit and contoured to cause flow separation and downstream vortex street having a periodicity which is a function of flow rate, and a rear non-streamlined section cantilevered behind said front section to define a gap which traps the vortices of the vortex street and strengthens and stabilizes the vortex street, said rear section being shaped to interfere with said vortex street, said rear section being slightly deflectable to a degree in which the maximum deflection thereof is not in excess of about 0.002 inches whereby it is excited into minute vibration by said street; and

C. strain gauge means to sense the vibrating motion of said rear section to produce a signal whose frequency is proportional to flow rate.

3,888,121
TEMPERATURE MEASURING APPARATUS

Donald E. Geldmacher, 40 N. McDonald, Mesa, Ariz. 85201

Filed Mar. 6, 1973, Ser. No. 338,573
Int. Cl. G01k 7/00
U.S. Cl. 73—362 R 9 Claims



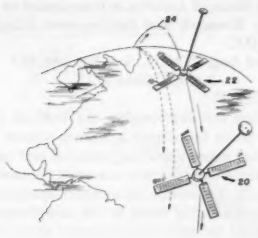
1. A thermometer comprising:
a mercury filled bulb,
a temperature sensing element attached to said bulb,
said sensing element comprising a pair of concentrically arranged inner and outer cylinders,
said inner cylinder having a canal formed in its outer surface a part of which traverses a helical path about the axis of said inner cylinder,
one end of said canal being connected to said bulb,
a plurality of conductors formed on the outer surface of said inner cylinder,
one end of each of said conductors being connected to a different point along the helical part of said canal to make electrical contact with the mercury in said canal when it expands to that point,
the other end of each of said conductors extending along said inner cylinder and terminating in an indicating device,
said outer cylinder surrounding said inner cylinder in sealing arrangement to encase the mercury moving in said canal,
an indicating device,
said device comprising a plate having a plurality of contacts one connected to the other end of all but a selected one of said conductors,
means for connecting the other end of the selected one of said conductors to a voltage actuated signal device, and a pointer on said plate connected to said voltage actuated signal device for selectively contacting the one of said contacts indicating the height of the mercury in said canal.

3,888,122
METHOD AND APPARATUS FOR OBTAINING THE FINE SCALE STRUCTURE OF THE EARTH'S GRAVITY FIELD

Harold D. Black, Highland, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 9, 1974, Ser. No. 495,954
Int. Cl. G01v 7/16
U.S. Cl. 73—382 5 Claims

1. A method for determining the direction of the sub-track and cross-track components of the local gravitational force vector over the surface of an ocean, comprising the steps of:
orbiting at least two satellites in predetermined coincidental orbits, the satellites being spatially separated in the orbital plane by a predetermined temporal interval;
measuring the height of each satellite above mean sea level as each of the satellites pass through a given point in inertial space;
determining the difference in height above mean sea level measured by the two satellites during the respective passes through the given point;
mathematically processing the difference in height thus measured to yield the cross-track component;
measuring the height of either one of the two satellites at two closely spaced points in inertial space; and

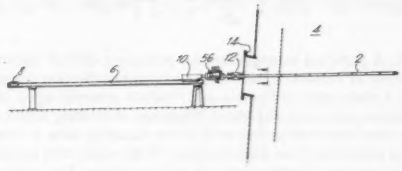


mathematically processing the two heights thus measured to yield the sub-track component.

3,888,123
APPARATUS FOR TAKING GAS SAMPLES IN SHAFT FURNACES

Ernest P. Küntziger, and Nicolas Lemmens, both of Assenede, Belgium, assignors to S.A. des Anciens Etablissements Paul Wurth, Luxembourg, Luxembourg

Filed Aug. 24, 1973, Ser. No. 391,361
Claims priority, application Luxembourg, Sept. 5, 1972, 65998
Int. Cl. G01n 1/24
U.S. Cl. 73—421.5 A 9 Claims



1. Apparatus for taking gas samples from a plurality of locations within the charge burden on the hearth of a shaft furnace comprising:
moveable probe means, said probe means including an elongated probe adapted to be introduced into and withdrawn from the furnace charge via a port in the furnace wall, said elongated probe including a central supporting tube and a plurality of rigid gas sampling pipes symmetrically arranged around said supporting tube, said gas sampling pipes each being provided with a gas entry aperture, said gas entry apertures being individually displaced along the longitudinal axis of the probe, said probe further comprising a tubular outer sheath surrounding said gas sampling pipes, said sheath being concentric with said central supporting tube and being provided with a plurality of gas entry ports individually displaced along the longitudinal axis of the probe, said gas entry ports being individually coupled to respective of said gas entry apertures in said gas sampling pipes, said sheath and central supporting tube defining an annular housing for said gas sampling pipes and a path for coolant flow in the free interspace between said sampling pipes;
drive means for applying longitudinal force to said probe means to urge said probe means into and to withdraw said probe means from the furnace charge; and
vibrator means coupled to said probe means for superimposing vibratory movement on to the longitudinal force during introduction of the probe into the furnace charge.

3,888,124
ATMOSPHERIC MERCURY SAMPLING MATERIAL AND METHOD

Evan E. Campbell; Bernard C. Eutsler, both of Los Alamos, and Patricio E. Trujillo, Santa Fe, all of N. Mex., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

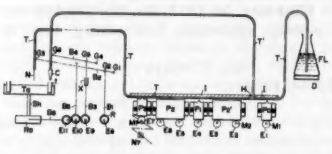
Filed Aug. 7, 1973, Ser. No. 386,465
Int. Cl. G01n *1/22*
U.S. Cl. 73—421.5 R 4 Claims

1. In a method for determining the content of metallic mercury vapor in air by passing a known volume of said air through a mercury vapor absorbing material and subsequently thermally desorbing the mercury adsorbed thereon and measuring its amount by atomic absorption spectroscopy, the improvement consisting of using as the adsorbing material a silvered particulate calcined diatomaceous earth substrate.

3,888,125
PUMP FOR PREPARING DILUTED LIQUIDS OF PREDETERMINED DEGREES OF DILUTION

El Mochida, 5-4, 2-chome, Komagome, Toshima-ku, Tokyo, Japan

Filed Apr. 10, 1974, Ser. No. 459,614
Claims priority, application Japan, Apr. 10, 1973, 48-40542
Int. Cl. G01n *1/12*
U.S. Cl. 73—423 A 5 Claims



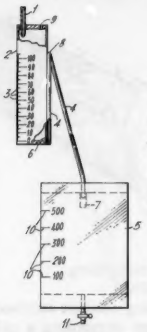
1. A pumping arrangement for preparing diluted liquids of a series of various degrees of predetermined dilution comprising a main tube of flexible and resilient material open at its extreme upstream end into a container of diluting liquid and its other end terminating with a fine charging tube, a branch tube extending from a base portion of the main tube provided at its extreme downstream end with a pipette, first upstream blocking means connected to block the main tube at a location upstream from the point of connection of the branch tube, second upstream from the point of connection of the branch tube, second upstream blocking means located downstream from the point of connection of the branch tube for blocking the main tube, and discharge means located adjacent the second upstream blocking means for pressing the main tube along a predetermined length thereof, and driving means for feeding test tubes successively one by one to the positions immediately below the pipette and the fine charging tube.

3,888,126
LIQUID MEASURING APPARATUS

David Edward Cross, Folkestone, England, assignor to Smiths Industries Limited, London, England

Filed July 11, 1973, Ser. No. 378,100
Claims priority, application United Kingdom, July 14, 1972, 32934/72
Int. Cl. G01f *19/00*
U.S. Cl. 73—426 14 Claims

1. Liquid-measuring apparatus comprising a first chamber having an inlet for supplying the liquid to be measured to aa predetermined level in said first chamber, said first chamber communicating with ambient atmospheric presure above said predetermined level, a second chamber for the liquid being measured, said second chamber having a substantially larger liquid-holding capacity than said first chamber, and a passageway intercoupling the two chambers for automatically conveying selected increments of the liquid being measured from the first chamber to the second chamber, said passageway opening into said first chamber below said prdetermined level and extending upwardly to said predetermined level and then downwardly to said second chamber so as thereby to provide an automatic siphon for draining a predetermined unit quan-

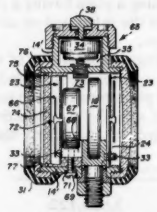


tity of the liquid out of the said first chamber and into said second chamber in response to the liquid content of the said first chamber reaching said predetermined level, said second chamber being graduated in terms of said unit quantity of liquid.

3,888,127
PORTABLE UNDERWATER INDICATING INSTRUMENT FOR DIVERS

Ralph B. Shamlian, Belmont, and Ashley J. Hollingsworth, Atherton, both of Calif., assignors to Farallon Industries, Inc., Belmont, Calif.

Continuation-in-part of Ser. No. 305,232, Nov. 10, 1972. This application Apr. 18, 1974, Ser. No. 462,099
Int. Cl. G01l *19/00*
U.S. Cl. 73—431 15 Claims

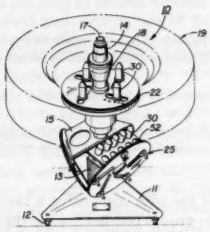


1. In a portable underwater indicating instrument to be carried by and for use by a diver:
first and second measuring means for measuring first and second quantities of interest to the diver;
first and second indicating means coupled to said respective first and second measuring means for indicating said first and second respective measured quantities to the diver;
housing means common to and for housing said first and second measuring and indicating means;
each of said indicating means including a face portion facing outwardly of said housing for viewing by the diver; and
said housing means including first chamber means open at opposite ends to receive and retain said first and second measuring and indicating means in back-to-back relation with their respective face portions facing outwardly of said housing means in opposite directions for viewing by the diver.

3,888,128
WHEEL BALANCING SYSTEM

Wallace F. Mitchell, Libertyville, Ill., assignor to Ammco Tools, Inc., North Chicago, Ill.

Filed May 31, 1974, Ser. No. 475,105
Int. Cl. G01m 1/12
U.S. Cl. 73—484 10 Claims



1. In combination with a wheel balancing device of the type including a base, a vertical spindle pivotably balanced on said base, means indicating the angular relationship of said spindle to the vertical, and means for mounting a wheel to said spindle, the improvement being in said last named means and the improvement comprising

a support member mounted to said spindle and having a planar upper surface surrounding said spindle and lying perpendicular to the longitudinal axis thereof,

a plurality of upstanding wheel supports resting on said planar surface, and

first and second locating plates disposed in mutually parallel relationship and each having a plurality of symmetrically disposed slots through which said supports respectively and slidably extend,

said slots being rectilinear and extending tangentially to a circle concentric with said longitudinal axis of said spindle,

the slots in said first plate being the mirror image of the slots in said second plate with the slots in said first plate overlying the slots in said second plate,

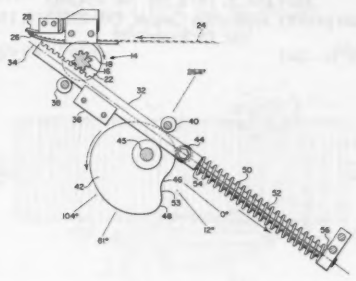
whereby relative rotation of said plates varies the radial positions of said wheel supports relative to said spindle without disturbing the symmetry of said locating plates and thus the balance of said spindle.

3,888,129
SHEET ACCELERATION AND SYNCHRONIZATION MECHANISM

George Michael Velan, Park Ridge, and Glenn Robert Peabody, Villa Park, both of Ill., assignors to Illinois Tool Works Inc., Chicago, Ill.

Filed Feb. 21, 1974, Ser. No. 444,443
Int. Cl. F16h 19/04
U.S. Cl. 74—29 5 Claims

1. A sheet feeding mechanism comprising a first shaft, a rack gear having a longitudinal axis, a pinion gear on said first shaft in mesh with said rack gear, a feed roller on said first shaft for feeding said sheets, a rotationally driven second shaft, drive means for driving said rack gear along its longitudinal axis, said drive means comprising a cam follower coupled to said rack gear and a rack drive cam on said second shaft which has a cam surface that interacts with said cam follower and has a curvature such that the rack gear is accelerated in the direction along its longitudinal axis which accelerates said feed roller in its paper-feeding rotational direction, sheet stop means, sheet stop carrier means for carrying said sheet stop means comprising a sheet stop cam follower and a sheet stop cam on said first shaft for actuating and deactuating said sheet stop means at predetermined times, and first and second spaced apart frame members each of which support one of the opposite ends of said first shaft, said pinion gear being secured on the end of said first shaft adjacent said first

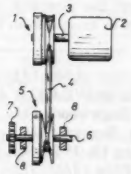


frame member while said sheet stop cam is secured on the end of said first shaft adjacent said second frame member.

3,888,130
ROTATION RESPONSIVE VARIABLE DIAMETER PULLEY

Léon Blanchette, St. Nicephore, County of Drummond, Quebec, Canada

Filed Nov. 13, 1973, Ser. No. 415,309
Int. Cl. F16h 55/22
U.S. Cl. 74—230.17 E 7 Claims

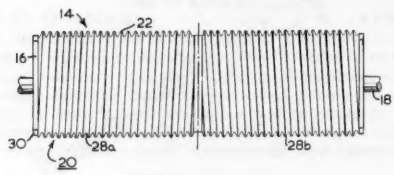


1. A variable diameter drive pulley comprising a pair of flanges coaxially mounted adjacent each other for rotation about a common axis, said flanges having one of their sides forming opposed faces which are radially diverging relative to each other to define a V-belt recess, one of said flanges is rotatably and axially displaceable relative to the other of said flanges, a cam means attached to said one flange, a cam-engaging means fixed to said other flange and arranged for bodily rotation therewith about said axis, said cam means having an axially camming surface engageable by said cam-engaging means upon relative angular retardation of said one flange relative to said other flange to axially displace said one flange towards said other flange, spring means biasing said one flange away from said other flange, and centrifugally responsive weight means urging said one flange in rotation relative to said other flange in a direction to cause angular retardation of said one flange relative to said other flange, and wherein said weight means are a pliable tie means attached at one end to said one flange and at its other end to said cam-engaging means, slackly extending between the same transversely of said common axis.

3,888,131
COVERING FOR BELT CONVEYOR IDLER ROLLS

Charles M. Reid, Calgary, Alberta, Canada, assignor to Elast-O-Cor Products & Engineering Limited, Alberta, Canada

Filed Oct. 5, 1973, Ser. No. 404,003
Claims priority, application Canada, Oct. 23, 1972, 154596
Int. Cl. F16h 7/18
U.S. Cl. 74—241 13 Claims

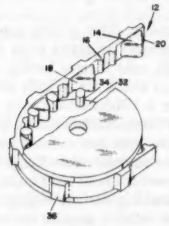


1. An idler roll covering for use in belt conveyor systems comprising a cylindrical sleeve of a flexible abrasion resistant material, said sleeve having thereon at least first and second outwardly projecting ribs integrally formed with said sleeve, said first and second ribs having respective inner ends located adjacent the mid-length portion of the sleeve and said ribs spiralling around said sleeve a plurality of times in the form of continuous spirals or helices towards opposing respective ends of the sleeve with the spiral or helix defined by the first one of said ribs being of opposite hand to the second one, first and second helical grooves being defined by the first and second spiral ribs respectively, said inner ends of said first and second ribs being spaced from one another at said mid-length portion of the sleeve, said ribs being dimensioned and proportioned in cross section such that when outer portions or crests of said ribs rollingly engage a surface of a loaded moving conveyor belt, the spiral or helical ribs are deflected and released in continuous cyclic fashion thereby tending to shake loose sticky particles and also tending to cause any particles in the grooves to be moved therealong, either toward the opposing ends of the sleeve or toward said mid-length portion of the sleeve, depending on the direction of rotation, whereby to permit said particles to escape from between said ribs.

3,888,132
POSITIVE DRIVE BELT AND SYSTEM

Paul E. Russ, Sr., Englewood, Colo., assignor to The Gates Rubber Company, Denver, Colo.

Filed May 15, 1974, Ser. No. 470,250
Int. Cl. F16g 13/02, 1/28; F16h 55/30
U.S. Cl. 74—247 10 Claims

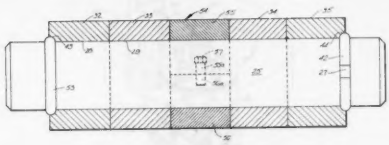


1. A positive drive belt comprising:
spaced elastomeric primary teeth secured to the belt, each primary tooth having a longitudinal base thickness; and
at least two spaced elastomeric secondary teeth secured to the belt interpositioned between and spaced from successive primary teeth, each secondary tooth having a height less the primary teeth and a longitudinal base thickness less than half of each primary tooth.

3,888,133
CONNECTING PIN AND RETAINING MEANS THEREFOR FOR MINING MACHINE TRIM CHAINS AND THE LIKE

Claude B. Krekeler, Cincinnati, Ohio, assignor to The Cincinnati Mine Machinery Company, Cincinnati, Ohio

Filed May 30, 1973, Ser. No. 365,271
Int. Cl. F16g 13/04; E21c 25/34
U.S. Cl. 74—254 18 Claims

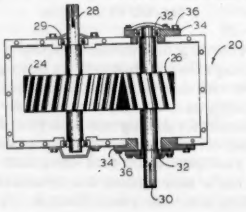


1. In a chain of the type comprising a plurality of link elements arranged in groups one behind the other with the ends of the link elements of adjacent groups being in interdigitated relationship and having transverse perforations coaxially aligned, improved means to join said interdigitated link element ends of the each adjacent pair of said groups comprising an elongated connecting pin passing through said coaxially aligned perforations of said interdigitated ends, first and second retaining means comprising annular abutment means so positioned on said connecting pin near the ends thereof as to cooperate with the outermost link element ends on said connecting pin to prevent inadvertent removal of said connecting pin from said coaxial perforations, at least one of said retaining means being removable from said retaining position to permit removal of said connecting pin from said coaxial link element perforations, and means to protect said at least one removable retaining means from wear from external sources comprising an annular undercut at that end of said transverse perforation of said outermost link element end facing said at least one removable retaining means, said last mentioned retaining means being located in part at least in said annular undercut and means to releasably maintain said at least one removable retaining means in part at least within said undercut to protect said last mentioned retaining means and prevent its inadvertent removal from said annular undercut while permitting its purposeful removal therefrom for assembly and disassembly of said chain.

3,888,134
ECCENTRIC SHAFT MOUNTING APPARATUS

Lawrence Thomas Miranda, 1064 Puolo Dr., Honolulu, Hawaii 96818

Filed June 3, 1974, Ser. No. 475,898
Int. Cl. F16h 57/00, 55/18, 1/04
U.S. Cl. 74—405 25 Claims



1. A power transmission apparatus with an adjustable, eccentric shaft mounting comprising:
a. a supporting frame,
b. a first rotary shaft rotatably mounted in the supporting frame,

c. a first toothed wheel mounted on the first rotary shaft,
d. rotatably adjustable eccentric bushings mounted in the supporting frame and capable of supporting a second rotary shaft at a point offset from the center of the eccentric bushing, and
e. a plurality of interchangeable second rotary shaft and second gear assemblies, rotatably mountable in the eccentric bushings comprising a plurality of second rotary shafts and a plurality of second toothed wheels of various diameters, each mounted on one of the interchangeable second rotary shafts and each equipped with a tooth structure capable of intermeshing with the tooth structure of the first toothed wheel;

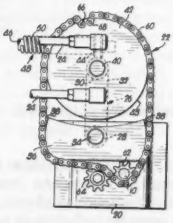
whereby, a gear ratio of the power transmission apparatus can be adjusted by removing one second rotary shaft and second toothed wheel assembly from the eccentric bushings, mounting another second rotary shaft and second toothed wheel assembly on the eccentric bushings, and adjusting the eccentric bushings so that a replacement second rotary shaft and second toothed wheel assembly is supported in such a position that the tooth structure of the second toothed wheel engages the tooth structure of the first toothed wheel.

3,888,135

CONTROL FOR STEERING, SPEED AND DIRECTION

Lowell J. Goering, Moundridge, Kans., assignor to Hesston Corporation, Hesston, Kans.

Division of Ser. No. 369,249, June 12, 1973. This application Aug. 23, 1974, Ser. No. 500,062
Int. Cl. B62d *1/20*
U.S. Cl. 74—496 **6 Claims**



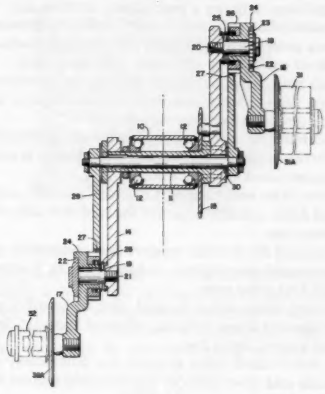
1. In a control mechanism:
a pair of members provided with arcuate peripheries;
means mounting one of said members for rotation about a first axis and for swinging about a second axis spaced laterally from said first axis;
a flexible drive entrained about the peripheries of said members;
means for operating said drive to rotate said one member and carry out a first control function; and
means for swinging said one member relative to the other to carry out a second control function,
said peripheries of the members being of substantially the same radius whereby said swinging of the one member may be carried out without causing operation of said drive and said rotation of the one member may be carried out without causing said one member to swing, enabling said control functions to be effected independently of and without influencing one another.

3,888,136

ADJUSTABLE PEDAL AND CRANK SYSTEM FOR FOOT PROPELLED VEHICLES

Fernand S. Lapeyre, 1224 Octavia St., New Orleans, La. 70115

Filed June 4, 1974, Ser. No. 476,207
Int. Cl. B62m *3/02*
U.S. Cl. 74—594.1 **10 Claims**



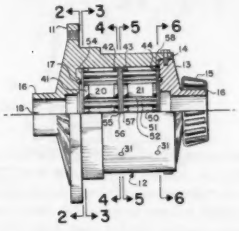
1. An adjustable pedal crank system for bicycles and the like for compelling rotation of the drive shaft, comprising a pair of primary drive cranks secured to said drive shaft, a pair of secondary drive cranks connected to the primary cranks and each having a pedal, means for locking said secondary drive cranks at any angular position of the secondary cranks relative to the primary cranks for propelling the vehicle, and foot actuated interconnecting means between both sets of secondary cranks for maintaining both pedals at equal distance from the drive shaft at all times even while effecting change of pedal drive arm length from the drive shaft axis.

3,888,137

DIFFERENTIAL DRIVE MECHANISM

Charles Henry Brieten, 330 W. Mulberry, Fredericksburg, Tex. 78624

Filed Feb. 25, 1974, Ser. No. 445,455
Int. Cl. F16h *35/04, 1/44;* **F16d** *15/00*
U.S. Cl. 74—650 **7 Claims**



1. A differential drive mechanism comprising.
a. an elongated drive cylinder having a first end and a second end and an inside and an outside mounted for rotation in a housing,
b. means for rotating said drive cylinder,
c. a first drive cam having a first side and a second side mounted for rotary motion inside said drive cylinder, said first drive cam being capable of receiving and rotating an axle in either a clockwise or counterclockwise direction,

d. a second drive cam having a first side and a second side mounted for rotary motion inside said drive cylinder adjacent but not securely attached to said first drive cam, said second drive cam being capable of receiving and rotating an axle in either a clockwise or counter-clockwise direction,

e. each of said drive cams further comprising equal numbers of symmetrical multiple convex arcuate drive cam lobes,

f. the interspacing of said multiple convex arcuate drive cam lobes defining a multiplicity of drive cam valleys,

g. a multiplicity of drive rollers having progressive dimensions positioned inside said drive cylinder adjacent each side of each valley and each drive cam lobe,

h. said multiple drive rollers frictionally contacting a cam drive surface when said drive cylinder rotates in a clockwise direction, and conversely,

i. said multiple drive rollers frictionally contacting a cam overrun surface when said drive cylinder is rotated in a counter-clockwise direction.

j. a first drive roller support disc compartibly positioned in said drive cylinder adjacent the said first side of said first drive cam,

k. a second drive roller support disc compatibly positioned inside said drive cylinder adjacent the said second side of said first drive cam,

l. a third drive roller support disc compatibly positioned inside said drive cylinder adjacent the said first side of said second drive cam,

m. a fourth drive roller support disc compatibly positioned inside said drive cylinder adjacent said second side of said second drive cam.

n. said first and said second drive roller support discs rotatably supporting a multiplicity of said drive rollers adjacent the valleys of said frist drive cam, and

o. said third and said fourth drive rollers support discs rotatably supporting a multiplicity of said drive rollers adjacent the valleys of said second drive cam.

3,888,138

PLANETARY DRIVE SYSTEM FOR ROLLS IN A MILL

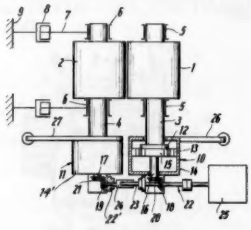
Heinz M. Hiersig, Dusseldorf-Oberkassel, Germany, assignor to Mannesmann-Meer Aktiengesellschaft, Monchengladbach, Germany

Filed Oct. 4, 1973, Ser. No. 403,633

Claims priority, application Germany, Oct. 11, 1972, 2250585

Int. Cl. F16h *37/06, 35/06*

U.S. Cl. 74—665 G **7 Claims**



1. In a drive system for two rolls in a rolling mill wherein at least one roll is journalled for displacement of its axis towards and away from the axis of the other roll, and including a drive motor for both said two rolls, comprising:

a first and second planetary gear each having a sun wheel, a spider for carrying planet gears meshing the sun wheel, and an internal ring gear meshing the planet gears, the spiders of the planet gears being respectively directly connected to the two rolls in coaxial relation to the respective roll for driving same;

a power branching transmission with a common, single, driven input connected to said drive motor and having shaft means extending transversely to said roll axes and having two driving outputs each providing a rotational output correspondingly effective transversely to said shaft means, said driving outputs being respectively connected to said sun wheels for driving same, said shaft means constructed for yielding displacement of the driving outputs relative to each other along the axial extension of the shaft means and following any displacement of said roll axes away from or towards each other, to maintain driving connection between the driven input and said driving outputs without interruption upon occurrence of said displacement;

and means for holding the internal ring gears of the planetary gears against rotation, the first and second planetary gears following the respective mutual displacement of the axes of the rolls.

3,888,139

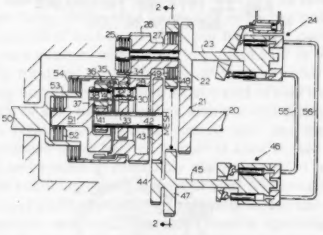
HYDROMECHANICAL TRANSMISSION

Elias Orshansky, Jr., San Francisco, Calif., assignor to Orshansky Transmission Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 259,549, June 5, 1972, which is a continuation-in-part of Ser. No. 154,976, June 21, 1971, abandoned. This application Sept. 25, 1972, Ser. No. 291,803

Int. Cl. F16h *47/04*

U.S. Cl. 74—687 **49 Claims**



1. A power transmission comprising

input means,

output means,

a planetary assembly having an input member, two coaxial output members, and reaction means, and having two separate and distinct sets of planet gears, each set being mounted on separate and distinct rotatable carriers,

means for alternately and separately connecting each of said output members to said output means, and

speed-varying means for causing one said output member to increase its speed and for simultaneously causing the other said output member to decrease its speed and vice versa.

3,888,140

INDEXING TURRET

Philip A. Mackelvie, Commerce City, Colo., assignor to Multi-Point Tool Co., Inc., Commerce City, Colo.

Filed Apr. 15, 1974, Ser. No. 461,004

Int. Cl. B23b *29/32*

U.S. Cl. 74—826 **13 Claims**

1. An indexing turret for use in combination with a machine tool, comprising:

a supporting base having a reference axis perpendicular to the general plane of the base;

an indexing head carrier by the base and mounted for linear retraction and extension toward and away from the base in the direction of the reference axis and for rotational

movement about the reference axis to a plurality of indexed positions;

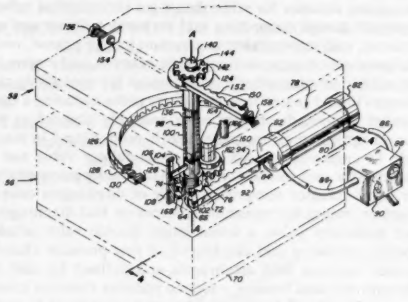
a first rotary actuator mounted on the base for rotation about the reference axis;

a first linear actuator connected to the first rotary actuator and mounted for reciprocating movement parallel to the general plane of the base to cause rotation of the rotary actuator in advancing and retracting directions through a predetermined angular range;

a reciprocating action servo motor connected to the first linear actuator;

a lift stud extending between the head and the base concentrically of the reference axis and slidably connected to the base for axial, non-rotary movement;

the stud having a first end threadedly connected to the first rotary actuator to be axially extended and retracted in response to advancing and retracting rotation of the actuator;



the stud having a second end connected to the head for rotary, non-axial relative movement to cause the head to extend and retract in unison with the stud;

interengaging indexing lock members connected to the head and base to lock the head in selected indexed positions and adapted to disengage upon extension of the head away from the base to allow rotation of the head;

a rotary drive shaft connected to a first end to the first rotary actuator to be rotated thereby;

and a second rotary actuator connected to the second end of the drive shaft to engage the head and rotate it through a predetermined angular distance to a succeeding indexed position;

the head being retractable toward the base in response to retracting rotation of the first rotary actuator to reengage the indexing lock members and positively retain the head in its indexed position during a machining operation.

3,888,141

MODULATING ARRANGEMENT FOR SERVO-MOTOR ACTUATED DISC BRAKE

Karl Gustav Ahlen, Stockholm, Sweden, assignor to S.R.M. Hydromekanik Aktiebolag, Sweden

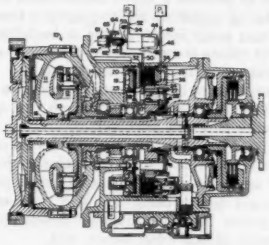
Division of Ser. No. 366,168, June 1, 1973. This application Mar. 15, 1974, Ser. No. 451,604

Claims priority, application United Kingdom, Mar. 21, 1973, 13599/73

Int. Cl. F16h *47/08*; F16d *33/00*

U.S. Cl. 74—730 **6 Claims**

1. A torque converter comprising: a stationary casing, a torridal chamber including a pump part, a turbine part, means for operatively connecting the turbine part to a turbine shaft, and a guide part, control means for varying the rotating speed of the guide part, said control means including a variable gear means and a friction brake for varying the operating position of the gear means, said friction brake having friction engaging surfaces, and including a servo-motor means for causing the friction braking surfaces to engage each other, a modulating means for modulating the engagement of the braking surfaces as the fluid is being supplied to the servo-motor, said modulating means comprising means for introducing pressurized oil into the location between the friction braking surfaces to at



least partially and momentarily counter the force of the servo-motor tending to engage the braking surfaces, said modulating means being operable to introduce pressurized oil into the said location in response to delivery of pressurized fluid to the servo-motor to engage the friction braking surfaces.

3,888,142

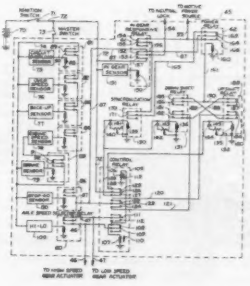
POWER DRIVE DOLLY WITH TWO-SPEED DRIVE SYSTEM

Heinrich H. Ziegele, South Euclid, Ohio, assignor to White Motor Corporation, Cleveland, Ohio

Filed Aug. 26, 1971, Ser. No. 175,131

Int. Cl. B60k *21/04*

U.S. Cl. 74—852 **5 Claims**



1. An auxiliary drive for an over-the-highway load carrying vehicle including a two speed drive means, comprising:

a. drive input means adapted for connection to a source of motive power, said drive input means being selectively engageable with high speed drive output means and low speed drive output means;

b. actuator means adapted to initiate engagement of said drive input means selectively with either of said output means;

c. control means adapted to regulate the speed at which said drive input means is driven and adapted to control said actuator means;

d. said control means being operable to effect down-shifting of said input means from engagement with said high speed output means to engagement with low speed output

means, and being operable to effect upshifting of said input means from engagement with said low speed output means to engagement with said high speed output means;

e. said control means being operable to de-energize said input means during disengagement and engagement with said output means;

f. said control means additionally including timing means operable to provide a timed deceleration of said input means during upshifting and to provide a timed acceleration of said input means during downshifting, whereby said input means is more nearly brought to the speed of the output means it is about to engage;

g. said control means being adapted to energize and deenergize said motive power means whereby the speed of said input means may be controlled;

h. said control means being operable to de-energize said motive power means during engagement and disengagement of said input means with said output means;

i. said control means being operable to re-energize said motive power means during said downshift to provide acceleration of said input means; and,

j. said control means including timing means operable to de-energize said motive power means for a first preselected interval of time during said upshifting, to de-energize said motive power means for a second preselected interval of time during said downshifting, and to re-energize said input means for a third preselected interval of time during said downshifting.

3,888,143

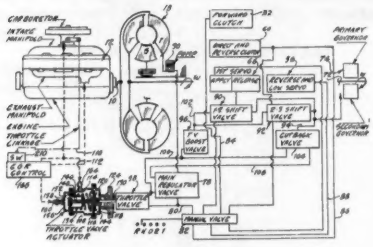
DUAL DIAPHRAGM ACTUATOR FOR A TRANSMISSION THROTTLE VALVE ASSEMBLY

Jack A. Kolehmainen, Detroit, and George E. Lemieux, Livonia, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 240,916, April 4, 1972, Pat. No. 3,765,272. This application Aug. 16, 1973, Ser. No. 389,065

Int. Cl. B60k *23/00;* **F02m** *27/02*

U.S. Cl. 74—863 **4 Claims**



1. A control valve system for an automatic power transmission mechanism for use with an internal combustion engine in a wheeled automotive vehicle driveline having an air-fuel mixture intake manifold and an exhaust gas manifold, said engine having an engine distributor adapted to deliver timed fuel ignition pulses for the engine, an engine throttle controlled carburetor throat, a pneumatically operated means connected to the engine carburetor throat for retarding the timing of the distributor for any given operating speed of the engine, said transmission mechanism having geared, multiple speed ratio torque delivery paths between said engine and the vehicle traction wheels, valve means for controlling speed ratio change in said geared torque delivery paths including a transmission vacuum diaphragm valve assembly having an actuator housing and a pair of diaphragms located in said housing and defining therein a pair of pressure chambers, said diaphragms being coupled together and connected to a pressure modulator transmission throttle valve the output of which is utilized as an engine torque signal, a pressure passage connecting one of said transmission vacuum diaphragm valve assembly chambers to the pneumatic distributor timing retarding means and a second pressure passage connecting the other transmission vacuum diaphragm valve assembly chamber to the engine intake manifold, spring means for urging the diaphragms toward an increased throttle pressure output signal position, the pressure forces established on said diaphragms by the pressure in said other transmission vacuum diaphragm valve assembly chamber opposing the force of said spring means.

3. A control valve system for an automatic power transmission mechanism for use in an internal combustion engine in a wheeled automotive vehicle driveline, said engine having an air-fuel mixture intake manifold and an engine carburetor with engine throttle controlled carburetor throat communicating with said manifold, an exhaust gas recirculation valve means for establishing controlled communication between said intake manifold and an engine exhaust gas region, a pneumatic actuator for said exhaust gas recirculation valve, a pressure passage connecting said carburetor throat and said actuator, said transmission mechanism having geared, multiple speed ratio torque delivery paths between said engine and the vehicle traction wheels, valve means for controlling ratio changes in said geared torque delivery paths including a transmission vacuum diaphragm valve assembly adapted to produce a throttle pressure signal that is proportional in magnitude to engine torque including a modulator valve and an actuator for said modulator valve, said transmission modulator valve actuator comprising a pair of diaphragms coupled together, means for transmitting forces on said diaphragm to said modulator valve, a transmission throttle valve actuator housing enclosing said diaphragms, a first pressure chamber located between said diaphragms and defined by said diaphragms and said housing, a second pressure chamber located on one side of said coupled diaphragms and defined by one of said diaphragms and said housing, and spring means for urging said diaphragms in one direction tending to produce an increase in the throttle pressure signal, said second chamber communicating with said intake manifold and said first chamber communicating with said carburetor throat.

3,888,144

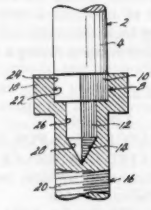
SCREW AND DRIVER

Joseph D. Parsons, 511 W. Osage St., Plattsburg, Mo. 64477

Filed Feb. 8, 1974, Ser. No. 440,850

Int. Cl. B25b *13/48*

U.S. Cl. 81—71 **1 Claim**



1. A screw and screw driver combination comprising:

a. a screw having a head and a reduced shank extending from said head, said screw having a socket formed therein and opening through the surface thereof opposite from said shank, said socket having a first section disposed entirely within said head and being square about the screw axis, a second section extending inwardly from the inner end of said first section and into said shank, said second section being coaxial with said first section and also square about the screw axis but of reduced size, and being of greater axial length than said first section, and a third section at the inner end of said second section, said

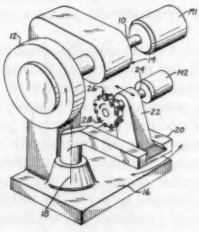
third section forming an axial extension of the square cross-sectional contour of said second section but tapering to a point toward the free end of said shank, so as to be pyramidal in form, and

b. a screw driver having a bit corresponding in shape to the internal contour of said socket and adapted to be inserted slidably but non-rotatably therein to fill said socket completely, and having first, second and third sections corresponding respectively to the first, second and third sections of said socket, whereby as said bit is inserted into said socket, said third bit section first engages in the outer end of said second socket section both to center said bit coaxially with said socket, and also, if the bit is angularly misaligned with said socket, to apply a rotary cam torque to said bit to turn it into angular registry with said socket, so as to facilitate the entry of the first and second bit sections into the corresponding sections of said socket.

3,888,145
METHOD AND APPARATUS FOR REMOVING TREAD MATERIAL FROM VEHICLE TIRES

James W. Heaton, Greensburg, and William E. Fawcett, Latrobe, both of Pa., assignors to Kennametal Inc., Latrobe, Pa.

Continuation of Ser. No. 379,372, July 16, 1973. This application May 17, 1974, Ser. No. 471,050
Int. Cl. B23b *3/00;* **B26d** *1/12*
U.S. Cl. 82—1 C **5 Claims**



1. The method of removing the tread material from a pneumatic tire preparatory to recapping thereof which comprises; inflating the tire, rotating the inflated tire on the axis thereof, mounting hard wear resistant circular cutting elements in circumferentially spaced and axially coplanar relation in a holder with each insert having a sharp peripheral edge protruding radially from the holder, presenting the holder to the tread of the tire with the axis of the holder parallel to the axis of the tire and with the inserts at a positive rake angle of at least about 25°, moving the holder with the inserts therein relatively to the tire, and feeding the holder and tire relatively in the radial and axial directions of the tire to cause each insert to take cleanly cut chips of substantial size from the tire tread whereby the said inserts form a plurality of circumferentially and axially distributed shallow grooves in the tire tread.

3,888,146
CONTOUR MACHINING

Arthur A. Tomenceak, Fairfield, Conn., assignor to The Bullard Company, Bridgeport, Conn.

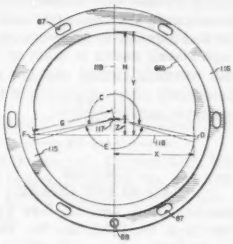
Division of Ser. No. 305,653, Nov. 13, 1972, Pat. No. 3,822,618. This application May 6, 1974, Ser. No. 467,374
Int. Cl. B23b *3/00, 27/10*
U.S. Cl. 82—1 C **7 Claims**

1. A method for machining a workpiece to form a chamber of generally epitrochoidal configuration, which comprises

a. rotatably supporting cutting tools for movement about an axis and causing the tools to be urged away from said axis;

b. so positioning the workpiece relative to the rotational axis of the cutting tools that said rotational axis intersects the major axis of the epitrochoidal contour at a point offset from the major axis thereof;

c. with the workpiece so positioned, machining a first lobe of said epitrochoidal contour, by advancing said workpiece and/or tools axially;



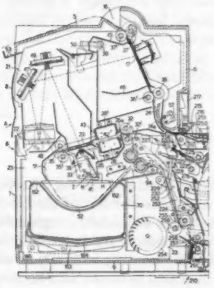
d. relatively repositioning the workpiece and cutting tools such that said rotational axis intersects said major axis on the opposite side of and offset from said minor axis; and

e. with the workpiece and tools thus relatively repositioned, machining the second lobe of the epitrochoidal contour.

3,888,147
CUTTING DEVICE FOR CUTTING SHEETS FROM A ROLL IN A COPY MACHINE

Giovanni Ravera, Torino, and Nicola Cosmo, Ivrea, both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Torino, Italy

Division of Ser. No. 251,994, May 10, 1972, Pat. No. 3,830,124. This application May 17, 1974, Ser. No. 471,079
Int. Cl. B26d *5/08*
U.S. Cl. 83—64 **5 Claims**



1. A cutting device for cutting sheets of paper from a roll in a copying machine comprising:

a rotatable cutting member having a cylindrical blade and a substantially helical cutting edge;

a movably mounted straight counter blade;

means for resiliently biasing said counter blade into contact with said cylindrical blade of said cutting member;

a first member mounted for rotation with said rotatable cutting member;

spring means for urging said first member in a first rotational direction;

latching means for preventing said first member from rotating under the influence of said spring means;

selectively actuatable release means for disengaging said latching means from said first member for allowing said

first member to rotate under the influence of said spring means for rotating said rotatable member through a cutting stroke;

means for resiliently biasing said first member to rotate in a second rotational direction opposite to said first direction, the rotational moment of said biasing means being less than the moment of said spring means; and

means actuated by said first member near the end of its stroke for releasing the tension on said spring means to allow said first member to be reset in said second direction by said biasing means in order to open a space between said rotatable cutting member and said counter blade immediately after completion of the cutting stroke of said rotatable cutting member.

3,888,148

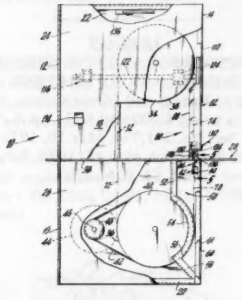
SAW BLADE GUARD

Bernard Weissman, 225 E. 48th St., New York, N.Y. 10017

Filed Sept. 14, 1973, Ser. No. 397,450

Int. Cl. B27g *19/06, 3/00;* **B23d** *55/02*

U.S. Cl. 83—100 **14 Claims**



1. In a power-operated saw having a vertically disposed saw blade wherein an upper portion of the blade is enclosed in a housing and the blade extends through an aperture provided in a generally horizontal work support table disposed below and spaced from said housing whereby an unconfined portion of the blade is disposed between said housing and work table, a saw blade guard for forming a barrier between said unconfined portion and an operator, said guard comprising an elongated barrier member disposed in confronting relation and spaced from the blade to present a barrier between the blade and the operator, the upper portion of said barrier member being mounted on said housing for vertical movement and is fully extended in full guard position when said member extends from said housing to a position adjacent said work table and may be manually raised to any desired degree of elevation along the otherwise exposed edge of the blade to thereby provide access to a selected portion thereof for operation on a work piece; and locking means for engaging said guard to maintain said enclosure at any one of a plurality of discreet selected vertical positions above the work table upon actuation of the saw and to release said guard and permit the same to drop to the level of the work table under the action of gravity to substantially cover the blade when the operation of the saw is terminated.

3,888,149

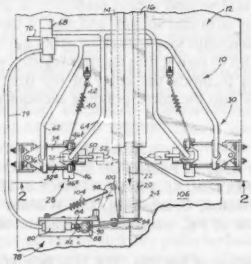
APPARATUS FOR CUTTING OFF SECTIONS OF AN ELONGATED MEMBER

Robert C. Hohmann, Grants Pass, Oreg., assignor to S. J. a/k/a Agnew Environmental Products, Tenino, Wash.

Filed June 1, 1973, Ser. No. 365,967

Int. Cl. B26d *5/38*

U.S. Cl. 83—291 **5 Claims**



1. Apparatus for breaking off portions of an elongated member moved longitudinally along a path, said apparatus comprising

a pair of opposed cutter elements disposed on opposite sides of said path and mounted for shifting along lines extending at substantial angles relative to said path between inoperative positions spaced laterally outwardly to opposite sides of said path and operative positions in said path, power-operated means operatively connected to said cutter elements operable on actuation to shift said cutter elements under power from their inoperative to their operative positions to drive the cutter elements into opposite sides of a member moving along the path therebetween, and

means mounting said cutter elements for movement with and at the same speed as said member is moved along said path, each cutter element being mounted for movement independently of movement of the other cutter element, whereby each element is permitted to follow the path of its associated side of the member independently of the other member.

3,888,150

BANDSAW BOOK TRIMMER

William Felix Stroud, deceased, late of McKellar, Canada; by Lois Evelyn Stroud, executrix, McKellar, Canada, and Edward John Stroud, McKellar, Canada, assignors to Stroud Graphic Equipment Limited, McKellar, Ontario, Canada

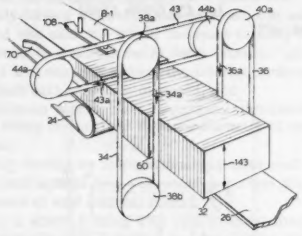
Filed Dec. 26, 1972, Ser. No. 318,617

Int. Cl. B26d *1/52*

U.S. Cl. 83—368 **4 Claims**

1. A machine for trimming selvage from a plurality of books comprising: a trimming station; means for advancing said books downstream to said trimming station; trimming means mounted on said trimming station and such that the edge from which the selvage is removed is opposite a spine of said book; a sensor mounted upstream of said trimming means and adapted to be resiliently biased into contact with one of said front page and said back page such that a change in the thickness of a book contacted by said sensor produces a corresponding change in the position of said sensor; and means operatively connected to said sensor and to said trimming means for detecting changes in the position of said sensor and

for causing a resulting change in the position of said trimming means when said book is trimmed thereby so that the width of



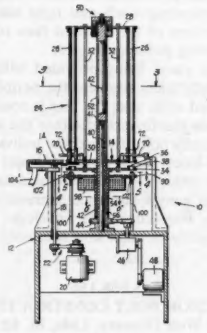
selvage removed by said trimming means varies directly with the thickness of the book.

3,888,151

CUTTING APPARATUS FOR STRIP STOCK

Frank S. Beckerer, and Frank S. Beckerer, Jr., both of c/o Beckson Manufacturing Inc., Box 3336, Bridgeport, Conn. 06604

Filed July 23, 1973, Ser. No. 382,079
Int. Cl. B26d *7/06*
U.S. Cl. 83—411 A **3 Claims**



1. An apparatus for cutting elongate strips of stock into pieces of predetermined length, comprising in combination:

a. a machine frame having an operation-performing station,

b. a saw carried by said frame at said station,

c. powered means for driving said saw,

d. a carrier member,

e. means mounting said carrier member for turning movement on said frame about an axis,

f. a plurality of holder devices including clamps disposed on said carrier member for releasably holding strips of stock to be cut, said strips of stock being advanceable in directions substantially parallel to said axis when the clamps are released,

g. stop means for limiting the advance to predetermined positions of said strips of stock when the latter are released,

h. said carrier member advancing the holder devices seriatim to said operation-performing station so as to feed the strips of stock laterally into the blade of the saw as the carrier member undergoes turning movement,

i. said clamps automatically releasing the strips of stock after each cutoff to present fresh portions for subsequent cutting,

j. powered means for turnably driving said carrier member, and

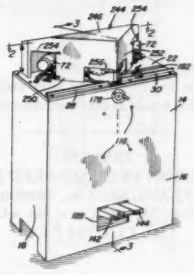
k. a friction clutch drive disposed between said carrier member and said powered means, said drive being adapted to slip a predetermined extent in response to the load imposed on the carrier member occasioned by the normal cutting operation of the saw in severing the strips of stock.

3,888,152

ADJUSTABLE ANGLE DOUBLE CUTTING MITRE CUTFF SAW

Glen B. Barton, P.O. Box 127, Calhoun City, Miss. 38916

Filed Feb. 6, 1974, Ser. No. 439,859
Int. Cl. B23d *45/14, 45/10, 47/00*
U.S. Cl. 83—471.3 **13 Claims**



1. A cut-off saw including a base provided with means defining a workpiece support surface, a pair of driven saw blades, mounting means supporting said blades in relatively angulated planes generally normal to said surface and with corresponding marginal portions of said blades closely adjacent each other and the line along which said planes intersect, for movement in said planes toward and away from said surface, and for angular displacement of said blades relative to said surface about axes at least closely adjacent and generally paralleling said line.

3,888,153

ANHARMONIC OVERTONE GENERATION IN A COMPUTOR ORGAN

Ralph Deutsch, Sherman Oaks, Calif., assignor to Nippon Gakki Seiko Kabushiki Kaisha, Hamamatsu-shi, Japan

Filed June 28, 1973, Ser. No. 374,680
Int. Cl. G10h *1/00, 5/00*
U.S. Cl. 84—1.01 **18 Claims**

1. An electronic musical instrument for synthesizing musical tones having anharmonic overtones, comprising:

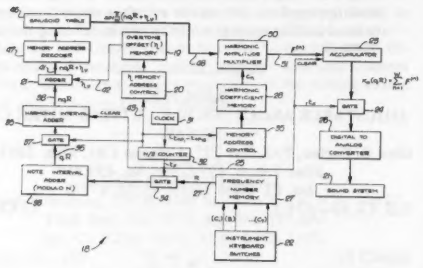
evaluation means for individually calculating the constituent Fourier component amplitudes $F^{(n)}$ of a musical waveshape in accordance with the relationship $F^{(n)}=C_n \sin(\pi/W)(nqR+\eta_\nu)$

wherein R is a frequency number establishing the fundamental frequency of the note, $n=1, 2, 3, \ldots, W$ designates the Fourier component and $\nu=n-1$ designates the overtone being evaluated, C_n is a harmonic coefficient establishing the relative amplitude of the th Fourier component, η_ν specifies the extent of anharmonicity of the ν^{th} overtone, and q is an integer incremented at regular time intervals t_z, all W of said constituent Fourier components being evaluated within each of said intervals t_z,

accumulator means for combining said separately calculated Fourier component amplitudes to obtain during

successive time intervals t_x the waveshape sample point amplitudes

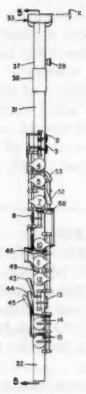
$$X_o(qR) = \sum_{n=1}^{W} F^{(n)}$$



for successive sample points qR, and

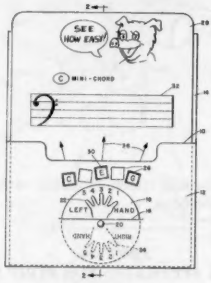
converter means for converting said sample point amplitudes to musical tones as said calculations are carried out.

3,888,154
END BLOWN FREE AIR-REED FLUTE
Sam Wesley, Sr., 52 Alvarado Ave., Pittsburg, Calif. 94565
Filed Feb. 25, 1974, Ser. No. 445,653
Int. Cl. G10d 7/02
U.S. Cl. 84—384 9 Claims



1. A flute comprising a hollow tubular body less than 2 inches in diameter and open at both ends, said body having a plurality of holes through the side wall thereof and spaced from each other along the length thereof, and one of said open ends of said body being provided with an embouchure comprising a lip plate providing an aperture for establishing a free air-reed at said one end of said body, said lip plate providing a surface extending transversely to the cylindrical axis of said body, said surface being smoothly curved in a first plane containing said cylindrical axis of said body and rectilinear in a second plane containing said cylindrical axis of said body perpendicular to said first plane, said surface in said second plane defining a line which intersects said cylindrical axis at an angle which differs from the perpendicular by at least 1° and not more than 5°.

3,888,155
FINGER PATTERN INDICATOR
Verna M. Leonard, 8701 Hwg. 41, Fresno, Calif. 93710
Filed July 24, 1974, Ser. No. 491,257
Int. Cl. G09b 15/02
U.S. Cl. 84—471 5 Claims



1. An aid for teaching keyboard fingering comprising:

a. an envelope having a rear panel and a forward panel, said panels being joined together at their side edges and bottom edges to define an upwardly open envelope;

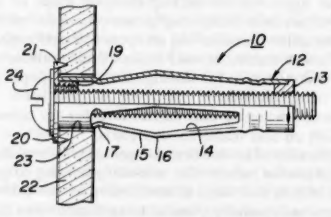
b. a rotatable dial pivoted to said forward panel;

c. indicia representing a left and right hand displayed on opposite portions of the forward face of said dial, said indicia including pointing fingers;

d. said forward panel being provided with five apertures disposed substantially adjacent the periphery of said dial and positioned such that the dial is rotatable into positions in which the fingers of either the left hand or the right individually point toward the individual apertures;

e. at least one insert sheet having a lower portion dimensioned to fit within said envelope and having a plurlaity of scale tone names displayed thereon such that when said sheet is inserted in the envelope said scale tone names are visible through said apertures.

3,888,156
ANCHOR BOLT CONSTRUCTION
Raoul Fima, 655 West Diversey, Lisle, Ill. 60101
Filed Mar. 29, 1974, Ser. No. 455,995
Int. Cl. F16b 13/06
U.S. Cl. 85—71 6 Claims



1. A removable anchor bolt for mounting to a hollow wall, comprising

a sleeve-like body having an external flange at one end,

an internally threaded nut positioned at the other end of said body,

said body having an internal thread in proximity to said one end,

the root diameter of said internal thread exceeding the root diameter of the thread in said nut and the minimum diameter of said external thread exceeding the root diameter of the thread in said nut

said body having a portion disposed between said internal thread and said nut which collapses radially outward in response to a compressive force exerted between said flange and said nut against the interior surface of a wall in which said anchor is disposed, and

the minimum internal cross-sectional dimension of said body being no less than the root diameter of said internal thread,

said body having an internal opening after said portion is collapsed against said wall which is no less than the root diameter of said internal thread,

whereby a screw mating with said internal thread can be threaded through said one end to engage said nut and stretch said body to reduce its external diameter to substantially its original size to permit removal of the anchor from a wall.

3,888,157

CIRCUIT ARRANGEMENT FOR WEAPONS USED IN ARMING AIRPLANES, PARTICULARLY TURRET GUNS

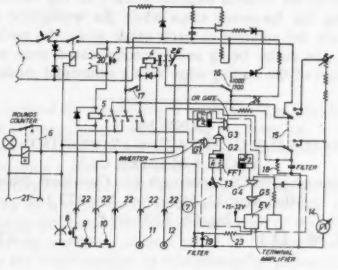
Ludwig Vorgrimler, Oberndorf (Neckar); Klaus Vorgrimler, Grunwettersbach, and Franz Stritt, St. Blasien, all of Germany, assignors to Industrie-Werke Karlsruhe Augsburg, Germany

Filed June 1, 1973, Ser. No. 366,163

Claims priority, application Germany, June 2, 1972, 2226760

Int. Cl. F41d *11/00*

U.S. Cl. 89—1 K **9 Claims**



1. In a circuit arrangement for loading electrically ignitable cartridges for weapons, particularly turret guns, destined for arming airplanes, and utilizing electronic components which are stable in a defined state, assume a metastable state, for the duration of a holding time, responsive to a triggering pulse, and flip back into the stable state at the expiration of the holding time, the improvement comprising, in combination, input terminals for connection to a source of electric potential; firing means actuable to establish a cartridge ignition circuit connected to said input terminals; a slow-acting relay energized from said source upon establishment of said ignition circuit and, after a predetermined time following interruption of the ignition circuit, with the weapon remaining inactive despite actuation of said firing means, closing a rely contact; a first said electronic component triggered, responsivie to closure of said relay contact, to generate an output pulse of defined duration; a second said electronic component; a first gate connecting said first said electronic component to said second said electronic component and triggered conductive by said output pulse to supply said output pulse to said second said electronic component; and an amplifier connected to the output of said second said electronic component and amplifying said pulse to the magnitude required for ignition of a loaded cartridge; said electronic components being monoflops.

3,888,158

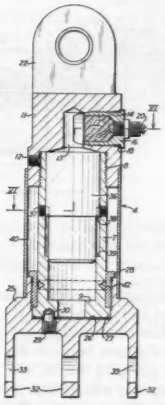
EXPLOSIVELY ACTUATED SEPARABLE CONNECTING DEVICE

Ernest E. Temple, Murrysville, Pa., assignor to Mine Safety Appliances Company, Pittsburgh, Pa.

Filed Aug. 30, 1973, Ser. No. 392,958

Int. Cl. F42b *3/00*

U.S. Cl. 89—1 B **2 Claims**



1. A separable connecting device for temporarily suspending a load from a support, comprising a barrel having a front wall and an opening in its rear end, the front end of the barrel being provided with a radial flange, a breech-block secured to said rear end and provided with a passage communicating with the rear end of the barrel, said passage being adapted to hold an explosive charge, a piston normally located in the rear end portion of the barrel but movable forward into engagement with said front wall, and means for connecting the breech-block and the front end of the barrel with a support and load, said front end connecting means being provided with a socket having an annular recess in its side wall of greater depth than said flange, said recess receiving said flange for limited axial sliding movements of the barrel relative to said front end connecting means, the side of said barrel being provided with an annular weakened area that will be fractured when the piston strikes said end wall upon detonation of said charge, whereby the barrel will separate into two parts and the front part will be driven forward relative to said front end connecting means.

3,888,159

LIQUID PROPELLANT WEAPON

Lester C. Elmore, Portola Valley, and Thomas M. Broxholm, Palo Alto, both of Calif., assignors to Pulsepower Systems, Inc., San Carlos, Calif.

Division of Ser. No. 179,759, Sept. 13, 1971, Pat. No. 3,803,975. This application Oct. 23, 1973, Ser. No. 408,572

Int. Cl. F41f *1/04*

U.S. Cl. 89—7 **3 Claims**

1. A leak path construction for a liquid propellant gun which insures leakage of combustion chamber gases to atmosphere rather than to the propellant supply and comprising,

a combustion chamber housing

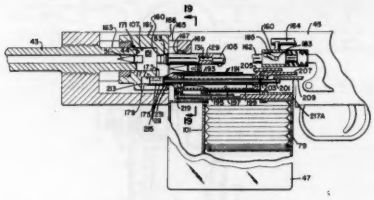
a port in the housing for supplying liquid propellant to the combustion chamber in the housing,

a valve element moveable to control the flow of propellant through the port,

a high pressure seal engaged between the valve element and the combustion chamber housing at one side of the port, a vent opening to the atmosphere located downstream of the high pressure seal on a side of the seal opposite from the side of the seal facing the port,

a reservoir for the liquid propellant,

pumping means for supplying liquid propellant from the reservoir to said port,



said pumping means including outlet structure engagable with the valve element to close the outlet and to thereby control the flow of propellant out of the pumping means, additional seal means between the valve element and the outlet of the pumping means, and

leak path passageway means having one end located to pick up any leakage that leaks past the high pressure seal and having another end connected to said vent opening to atmosphere and constructed to extend around said additional seal means for insuring that any leakage past the high pressure seal leaks to atmosphere through said vent opening and is isolated from the propellant in the pumping means and reservoir.

3,888,160

TOBACCO SMOKE FILTER

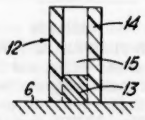
David Thomas Westcott, and Geoffrey Roger Woodman, both of Bristol, England, assignors to Imperial Tobacco Group Limited, London, England

Division of Ser. No. 217,797, Jan. 14, 1972, Pat. No. 3,791,265. This application Aug. 31, 1973, Ser. No. 393,591

Claims priority, application United Kingdom, Feb. 1, 1971, 3550/71

Int. Cl. A24c *5/50*

U.S. Cl. 93—1 C **8 Claims**



1. A method of making a selectively compacted tobacco smoke filter comprising providing a cylinder of filter material and compacting only a core section of the cylinder, leaving an annular uncompacted wall extending around the compacted core section.

3,888,161

CUTTING PROCESS AND DEVICE FOR PRODUCING PARALLEL-FLANKED GROOVES

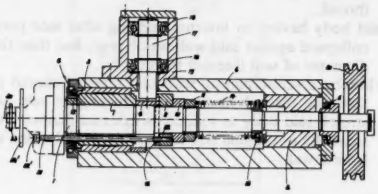
Adolf Baudermann, Neckarhausen, Germany, assignor to Cross Europa-Werk GmbH, Wendlingen, Germany

Filed Aug. 29, 1973, Ser. No. 392,641

Claims priority, application Germany, June 4, 1973, 2328372

Int. Cl. B23b *3/28;* **B27f** *1/02, 1/06*

U.S. Cl. 90—11 C **20 Claims**



1. The method of cutting a sidewall of a groove in a workpiece which comprises the steps of: providing a rotary cutter having a central body portion and at least on radially extending cutting portion rigidly connected thereto and a cutting edge along said radial cutting portion; rotating the cutter about its axis to bring the cutting edge thereof into the workpiece and simultaneously axially advancing the cutter as a unit toward the desired finished surface of the sidewall until the rotating cutting edge is tangent therewith; thereafter continuing to rotate the cutter in the same direction but now axially retracting the cutter to move the rotating cutting edge thereof away from the desired finished surface of the sidewall, and repeating the foregoing steps while the workpiece and the cutter are fed relative to each other along the path of the groove, the cutter being axially reciprocated once per each revolution of the cutting edge with a sinusoidal motion.

3,888,162

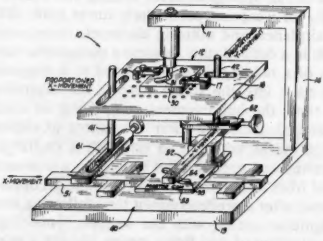
APPARATUS FOR GENERATING PROPORTIONAL CAMS FROM A MASTER CAM

Paul Maenner, 2959 Scarborough Rd., Cleveland, Ohio 44118

Filed May 22, 1974, Ser. No. 472,161

Int. Cl. B23c *1/18*

U.S. Cl. 90—13.1 **12 Claims**



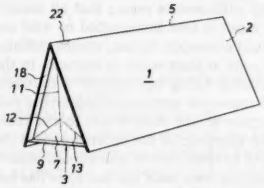
1. A cam generating apparatus for moving a cam blank relative to a cam cutter to generate a cam contour from a master cam, comprising:

a. a base structure;

b. a pair of slides movably carried by said base structure for movement in mutually perpendicular directions;

c. a master cam carried on one of said slides;
d. a cam follower carried on the other of said slides and engageable with said master cam for moving said other slide in directions perpendicular to the movement of said one slide in accordance with the configuration of said master cam;
e. first proportioning means connected to said one slide for generating an output which is proportional to the movement of said one slide;
f. second proportioning means connected to said other slide for generating an output which is proportional to the movement of said other slide; and,
g. cam blank support means connected to said first and second proportioning means for moving a cam blank relative to a cam cutter in response to said outputs to generate a cam contour on such cam blank.

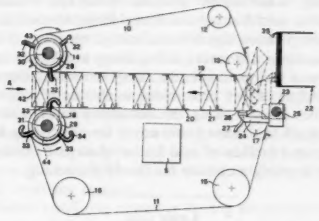
3,888,163
FOLDING CONTAINER FOR LIQUIDS
Masanori Watanabe, Tokyo, Japan, assignor to Toppan Printing Co., Ltd., Tokyo, Japan
Division of Ser. No. 135,896, April 21, 1971, abandoned. This application June 14, 1973, Ser. No. 370,162
Claims priority, application Japan, Apr. 23, 1971, 46-39836
Int. Cl. B31b *49/02*
U.S. Cl. 93—36.01 **2 Claims**



1. A method for producing a container for liquids in the shape of a triangular prism including the steps of:
a. folding a piece of cardboard along a center line thereof to provide a piece of folded cardboard;
b. inserting said folded cardboard into a triangular prismatic cavity of a mold so as to contact closely with the two rectangular inside surfaces of the cavity of the mold;
c. inserting a molten parison made of thermoplastic resin into the inner portion of said triangular prismatic cavity of the mold; and
d. blowing up said parison so as to form blown resin film attaching firmly on the inside surfaces of said cardboard and to form resin films on the remainder walls of the triangular prismatic cavity of said mold for forming creases on each of said resin films along fine ridged lines provided on the respective wall surfaces of the cavity for producing a folding container.

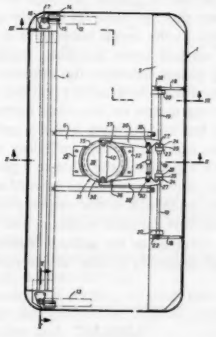
3,888,164
CARDBOARD BOX CONVEYOR
Carlo Taddei, Padenghe Sul Garda (Brescia), Italy, assignor to Seal Spout Europe S.p.A., Castiglione Delle Stiviere (Mantova), Italy
Filed Aug. 14, 1973, Ser. No. 388,250
Claims priority, application Italy, Aug. 24, 1972, 28480/72
Int. Cl. B31b *1/78*
U.S. Cl. 93—53 R **9 Claims**

1. In a conveyor system for cardboard boxes intended to have a parallelepipedal final shape including a magazine in which the boxes are stored flat one against the other with the sidewall closed and the end limbs open and a device adapted to draw the boxes from said magazine and to feed them onto a conveyor opened in their parallelepipedal final shape, the improvement comprising said conveyor which includes at least one flexible member driven in a closed loop so as to define two laps parallel to one another and spaced apart through a distance equal to the box width, a plurality of retaining members affixed to and properly spaced apart from each other on said flexible member, adjustable motive drive means for continuously moving said flexible member so that said



parallel laps are advanced in the same direction and synchronously with respect to each other with the retaining members on said parallel laps staggered to correspond to the thickness of a box by defining a plurality of couples of confronting shoulders adapted to receive therebetween a box which will abut each shoulder couple in correspondence with two diagonally opposite edges of said box.

3,888,165
VENTILATOR FOR A MOTOR VEHICLE ROOF
Rainer Hattass, Rothenbergen, and Herbert Kouth, Schoneck, both of Germany, assignors to H. T. Golde GmbH, Germany
Filed Nov. 9, 1973, Ser. No. 414,454
Claims priority, application Germany, Nov. 10, 1972, 2254962
Int. Cl. B60h *1/24*
U.S. Cl. 98—2.14 **13 Claims**



1. In a ventilator for a motor vehicle roof having an opening in which the ventilator is displaceably positionable, comprising a cover arranged to be positioned within and to form a displaceable closure for the opening, said cover having a front side, a rear side, and a pair of spaced lateral sides extending between said front and rear sides, means for displaceably supporting said cover within the roof opening comprising first

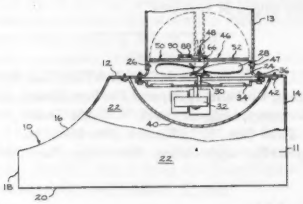
means connected to said cover for pivotally mounting said cover adjacent its front side, second means connected to said cover for pivotally mounting said cover adjacent its rear side, locking means associated with said second means for locking said cover in any position, said means for displaceably supporting said cover comprises a frame fixed to and arranged to extend around and depend from the opening in the motor vehicle roof, said frame having a front side, a rear side, two lateral sides extending between the front and rear sides, and corresponding to the front side, rear side, and lateral sides, respectively, of said cover, said first means and second means connected to said frame, said frame being shaped to form a gutter located below the sides of said cover when it is in the closed position, said cover comprising a plate arranged to extend across the opening and a flange extending downwardly from the edges of said plate along each side of said cover, a seal member formed along the outwardly facing side of said flange on each said side of said cover for effecting a seal with the juxtaposed surface of said frame when said cover is positioned for forming a closure for the roof opening.

3,888,166

MOLDED PLASTIC FLUE DAMPER

Richard L. Stottmann, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Apr. 12, 1974, Ser. No. 460,344
Int. Cl. F23l *17/02*
U.S. Cl. 98—85 **9 Claims**



1. A flue damper comprising a stationary support beam and a generally flat, light-weight, hinged plate on at least one side of the beam, and a pair of spaced snap-together hinging means between the beam and the plate so that the plate may pivot freely with respect to the beam between a horizontal closed position and a vertical open position, each of said snap-together hinging means between the support beam and the hinged plate comprising a horizontal pivot bar on one member and releasible spring means on the other member for slipping around the pivot bar and forming a loose, generally frictionless, hinge connection, the beam including stop means beneath the plate for supporting the plate in a generally horizontal closed position, such that when an upward airflow is caused to bear against the underside of the hinged plate this plate will assume a generally vertical open position, and when the direction of airflow is reversed or the airflow discontinued then the hinged plate will naturally return to its normal horizontal closed position.

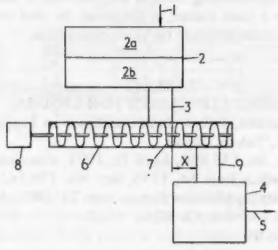
3,888,167

HEAT TREATMENT OF PARTICULATE SOLID MATERIALS IN CONTINUOUS FLOW

Granville Lewis Starkie, Crawley, England, assignor to The A.P.V. Company Limited, Crawley, Sussex, England

Filed Sept. 5, 1973, Ser. No. 394,495
Int. Cl. A23l *3/18*
U.S. Cl. 99—467 **5 Claims**

1. In a heat treatment plant of the positive displacement type for the treatment, such as sterilization, of particulate solid material in continuous flow and having a connection connected or connectable to a receiving plant such as an aseptic filling and sealing unit, the heat treatment plant comprising a hot zone in which the material is heated to the required treatment temperature and a cooling section in which the material is reduced to a temperature at which it can be held without significant damage: a reversible transfer conveyor situated downstream of the cooling section and upstream of the connection to the receiving plant, said conveyor having an input in communication with said cooling section and an output in communication with the connection to the receiving plant, said conveyor input and output being spaced



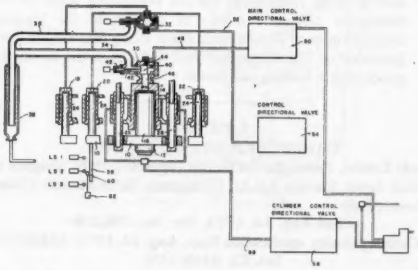
apart a distance sufficient to insure that all material entering said conveyor input is first transported by said conveyor before entering said conveyor output, means defining a temporary retention zone at least equal in capacity to the hot zone, said retention zone being operatively associated with said conveyor, said conveyor normally transferring material from the cooling section to the connection to the receiving plant and whereby on stoppage of the receiving plant the conveyor may be reversed to feed treated and cooled material into the temporary retention zone until the hot zone has been cleared, and on recommencement of normal drive to the conveyor, the material in the temporary retention zone will be fed on to the connection to the receiving plant.

3,888,168

HYDRAULIC APPARATUS AND CONTROL FOR A PRESS

Francis Joseph Kent, Wallingford, and Seymour E. Steinbrook, Wynnewood, both of Pa., assignors to Wean United, Inc., Pittsburgh, Pa.

Filed June 4, 1973, Ser. No. 367,051
Int. Cl. B30b *15/20*
U.S. Cl. 100—48 **7 Claims**



1. In a press having at least a first piston cylinder assembly and a group of second piston cylinder assemblies for causing a ram of the press to pass through its working stroke,

a first and a second power source for said piston cylinder assemblies,

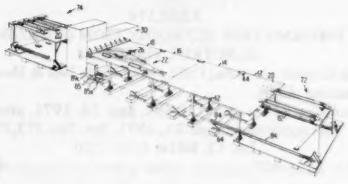
means sentitive to a change in the speed of said ram during its working stroke,,
means for connecting one of said power sources to at least said first piston cylinder assembly to commence the working stroke, and
means for selectively connecting said other power source to at least one of said second piston cylinder assemblies with reference to a detected change in the speed of said ram to control the speed of said ram during its working stroke.

3,888,169

MACHINE TOOL WITH IMPROVED LONG FLOATING JIG FIXTURE TABLE

Melville McNaughton, Ottawa, Ontario, Canada, assignor to Campeau Corporation, Ottawa, Ontario, Canada

Filed Nov. 29, 1973, Ser. No. 420,047
Int. Cl. B30b *15/00*
U.S. Cl. 100—100 **8 Claims**



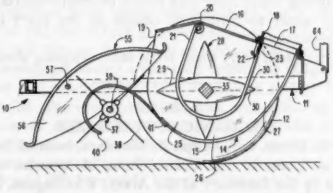
1. A machine for carrying out manufacturing operations on large structures comprising:
elongated flexible floating table having;
a plurality of large rectangular metal plates laid side by side;
a travelling tool means for applying a force to the upper surface of the table, said travelling tool also comprising a means for reacting the force at the under surface of the table;
a multitude of deflectable support members for supporting each plate over the entire area and for allowing passage of the force reacting means; and
means for joining one plate to an adjacent plate, said joining means comprising a keyway milled within the thickness of each plate, a key fitting within both keyways so as to maintain the surfaces of both plates flush and strap means securing the edges of the plates together.

3,888,170

APPARATUS FOR COLLECTING DEBRIS

Charles W. Doering, Clarksville, Ind., assignor to Brinly-Hardy Co., Inc., Louisville, Ky.

Division of Ser. No. 342,166, March 16, 1973, Pat. No. 3,849,824. This application May 6, 1974, Ser. No. 467,394
Int. Cl. E01h *1/04*
U.S. Cl. 100—177 **13 Claims**



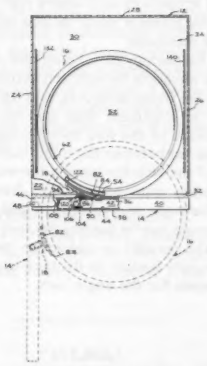
1. An apparatus for collecting debris including:
a frame having wheels to support said frame;
a housing supported by said frame;
said housing having means to receive debris;
a plurality of blades disposed within said housing and mounted for rotation about an axis, said blades being spaced from each other in the axial direction;
means disposed within said housing between each adjacent pair of said blades and cooperating with said housing to form a debris confining chamber within said housing and a compression chamber within said housing between said receiving means and said debris confining chamber;
said blades advancing the debris from said receiving means to said compression chamber and from said compression chamber to said debris confining chamber to compress debris received by said receiving means by said blades advancing from said receiving means to said compression chamber, from said compression chamber to said debris confining chamber, and from said debris confining chamber to said receiving means;
said disposed means cooperating with said blades to substantially strip any debris from said blades prior to said blades advancing from said debris confining chamber to said receiving means;
said debris confining chamber having an outlet adapted to receive a debris containing device;
and means to rotate said blades.

3,888,171

REFUSE COMPACTOR

William A. Eckerle, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Apr. 26, 1974, Ser. No. 464,530
Int. Cl. B30b *1/18*
U.S. Cl. 100—229 A **10 Claims**

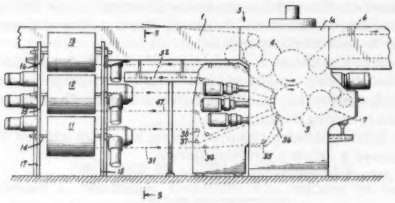


1. A household refuse compactor comprising:
a frame defining a compacting chamber and an access opening thereinto;
a door pivotally mounted along one of its sides to said frame adjacent said access opening;
means for pivotally mounting an open top refuse container on the inner side of the said door at a point intermediate the door sides; and
biasing means for urging the container toward the mounted side of the door, whereby the container pivots about the door hinge as the door is moved between an extreme open position and an intermediate position, at which the container is aligned with the frame access opening, and thereafter pivots about the pivotal mounting means to move along an approximately linear path within the compactor frame as the door is moved between said intermediate position and a closed position.

3,888,172
INTAGLIO PRINTING PRESS WITH WEB WIPING APPARATUS HAVING SUPPLY AND TAKE-UP REELS OUTSIDE FRAME

Salvatore F. D'Amato, Floral Park, and Chauncey P. Foote, Jr., Katonah, both of N.Y., assignors to American Bank Note Company, New York, N.Y.

Filed June 21, 1973, Ser. No. 372,087
Int. Cl. B41f *9/14*
U.S. Cl. 101—156 **11 Claims**



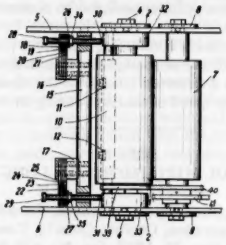
8. Web wiping apparatus for an intaglio press, comprising:
a. two parallel horizontally elongated press frame members between which the operative elements of the press are journaled;
b. a continuous wiping web;
c. a supply reel for said web;
d. a take-up reel for said web;
e. means for supporting said supply reel outside said frame members for rotation about an axis extending parallel to said frame members;
f. means for supporting the take-up reel outside the other of said frame members for rotation about an axis extending parallel to the frame members, said frame members being apertured in alignment with said supporting means to permit passage of the web therethrough;
g. a first angle bar between the frame members and adjacent the path of the web for turning the web from movement in a direction transverse to said frame members to a direction between and parallel to said frame members;
h. a second angle bar for turning the web from a return path between and parallel to said frame members to another transverse path leading to the take-up reel; and
i. support means for the angle bars.

3,888,173
TEMPERATURE RESPONSIVE INKING APPARATUS FOR A PRINTING MACHINE

Gerhard Ritzerfeld, Schorlemer Allee 14, 1000 Berlin 33, Germany

Filed Feb. 26, 1973, Ser. No. 335,919
Claims priority, application Germany, Feb. 28, 1972, 2210020
Int. Cl. B41f *31/32*
U.S. Cl. 101—350 **9 Claims**

1. Temperature responsive inking apparatus for a printing machine, comprising a first ink roller rotatable about a fixed axis; a second ink roller cooperating with said first ink roller for supplying ink thereto; means for supplying ink to said second ink roller; mounting means supporting said second ink roller for rotation about its axis and for movement toward and away from said first ink roller; and temperature responsive control means engaging said mounting means for pressing said second ink roller towards said first ink roller with a force decreasing with increase of the temperature of the apparatus and vice versa so as to automatically maintain between said

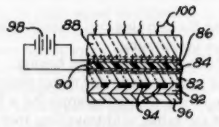


first and second ink rollers an ink-containing gap of substantially constant width.

3,888,174
INFORMATION REPRODUCTION UTILIZING ELECTRET MATERIAL

Joseph Gaynor, Arcadia, Calif., assignor to Bell & Howell Co., Pasadena, Calif.

Continuation of Ser. No. 110,491, Jan. 28, 1971, abandoned. This application June 21, 1973, Ser. No. 372,373
Int. Cl. B41m *5/18, 5/20*
U.S. Cl. 101—467 **4 Claims**



1. In an electrostatic copy process, the steps of:
providing a transfer sheet having a surface coated with electret-forming, heat softenable, solid transfer material;
positioning a receiving sheet for said transfer material in contact with said transfer material;
applying a D-C potential across said transfer material;
thermally forming a design on said transfer material in the form of heat-softened transfer material for transfer of said softened transfer material to said receiving sheet;
cooling said transfer material to solid form while said D-C potential is applied; and
separating said receiving sheet from said transfer sheet whereby to carry said design on the surface of said receiving sheet in the form of a charged design of electret material raised in relief from said surface;
applying toner to said charged design of raised, electret material;
positioning a copy sheet in surface contact with the toned side of said raised electret material;
transferring toner from said raised electret material to said copy sheet to form said design in the form of toner thereon; and
separating said copy sheet from said receiving sheet.

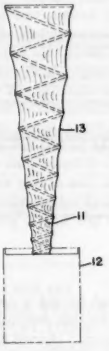
3,888,175
MECHANICAL STABILIZER

George D. Dusoe, and Joseph R. Messineo, both of Patterson, N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 18, 1966, Ser. No. 588,279
Int. Cl. F42b *13/32, 25/00*
U.S. Cl. 102—4 **3 Claims**

1. In a munition having a body and a rear base, said rear base having a floor and an outer flange defining a recess,

the improvement comprising, in combination therewith, a rear stabilizer for controlling the trajectory of said munition, said rear stabilizer comprising a helical coil spring having convolutions of gradually increasing widths, said spring being attached at its innermost convolution directly to the center region of said floor of said recess, and a collapsible frustoconical covering for said spring extending from the innermost to the outermost convolution of said spring,



said spring and covering being normally confined in compressed and collapsed condition in said recess and having the portion of the covering which surrounds the outermost convolution of said spring in engagement with the flange of said recess, and said covering forming in the released position of said spring an empty hollow elongated inverted frustoconical stabilizing surface at the rear of said munition;

whereby when said munition is launched, said spring will extend itself outwardly upon centrifugal forces generated by in-flight movements of said munition.

3,888,176

ALGICIDAL POST TREATED ROOFING GRANULES

John C. Horal, Jr., and David C. Little, both of Hagerstown, Md., assignors to GAF Corporation, New York, N.Y.

Filed Oct. 25, 1972, Ser. No. 300,864

Int. Cl. C09k *3/00*

U.S. Cl. 106—15 AF **30 Claims**

1. Algicidal roofing granules capable of inhibiting or preventing the growth of discoloring algae and fungi organisms upon exposure of roofing surfaces containing such granules to atmospheric weathering for extended periods of time, comprising:

a. base mineral granules;

b. a moisture permeable, durable, water insolubilized, pigmented, fired, inorganic alkali metal silicateclay coating on said base granules;

c. a processing oil composition present in an amount within the range of from about one-fourth gallon to about 1½ gallons per ton of base granules, said processing oil forming a thin film on the surface of said coated granules, said processing oil having a viscosity within the range of from about 100 to about 500 SUS, measured at 100° F; and

d. metallic algicides in the oil film and adhering to the surface of said granule coating, said algicides having a particle size not exceeding about 100 mesh and being present in amounts within the range of from about 0.05% to about 1.0% by weight based on the weight of the base mineral granules, metallic algicidal ions being leachable from said algicides upon exposure thereof to moisture during atmospheric weathering, whereby the weathering away of said processing oil upon stmospheric exposure of roofing surfaces incorporating said granules does not adversely affect the adherence of said metallic algicides to said granule coating, the presence of moisture during periods of rain and dew causing ionization of said metallic algicides with the resulting metallic ions being slowly leached from said granules to retard the growth of algae and fungi, thus enhancing the resistance of said roofing surfaces containing such granules to discoloration during extended periods of exposure of atmospheric weathering.

3,888,177

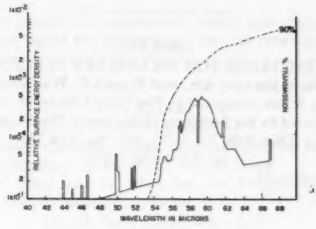
FLARE SYSTEM

Jesse F. Tyroler, Dover, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Division of Ser. No. 195,880, Nov. 4, 1971, abandoned. This application Feb. 15, 1974, Ser. No. 443,161

Int. Cl.² F42B *4/26;* **G01J** *3/48*

U.S. Cl. 102—31 **4 Claims**



1. A method for discriminating between visible, apparently identically colored flares, wherein a polyemitter flare composition has at least two predominant color emitters which in combination produce a visible color apparently identical when viewed with the eye to that produced by another flare composition having a different predominant color emitter which comprises viewing the ignited flare compositions through a filter capable of eliminating the spectral wavelength of at least one of the predominant color emitters of the polyemitter flare composition, such that when viewed with the eye through the filter the polyemitter composition has a different color than the other flare composition.

3,888,178

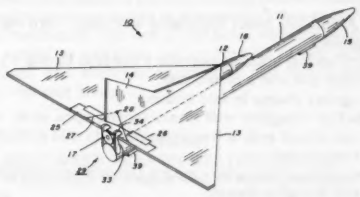
MODEL ROCKET-GLIDER

Walter E. Senoski, 1720 Elderslee Rd., Pittsburgh, Pa. 15227

Filed Oct. 30, 1974, Ser. No. 519,192

Int. Cl. F42b *15/16;* **A63h** *27/06*

U.S. Cl. 102—34.1 **12 Claims**

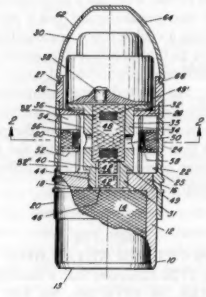


1. A model rocket-glider assembly, for use with a solid fuel motor having a propellant charge and a blow-out charge, said assembly comprising:

a. at least two tubes, said tubes being closed at their forward ends and open at their after ends, said tubes being secured parallel to their longitudinal axes, the interiors of at least two of said tubes being in open communication adjacent the forward portions thereof;

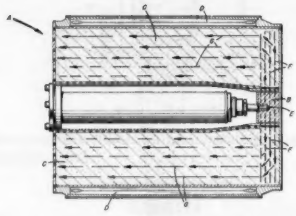
b. wings affixed to at least one of said tubes, said wings having a hinged elevator formed in the trailing edge thereof;
c. means for mounting the solid fuel motor in the after end of one of said tubes;
d. means disposed in the after end of at least one of the other of said tubes for retaining said elevator parallel to the horizontal plane of the wings prior to ignition of said blow-out charge, said elevator retaining means arranged so as to disengage from said elevator upon the urging of gases generated upon ignition of said blow-out charge, the said gases being propagated forwardly through the tube in which the motor is mounted and rearwardly through the tube in which the elevator retaining means is disposed; and
e. resilient means for biasing said elevator at a predetermined up-angle relative to the horizontal plane of the wings subsequent to disengagement of said elevator retaining means from the elevator.

3,888,179
INITIATOR FOR INCENDIARY PELLET
Kermit Nord, Harvest, Ala., and Francis C. Wallenhorst, Coon Rapids, Minn., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.
Filed Feb. 23, 1973, Ser. No. 334,786
Int. Cl. F42h *13/14*
U.S. Cl. 102—66 **5 Claims**



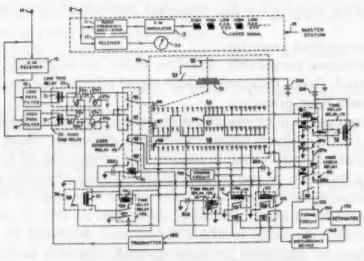
1. A multiple pellet dispensing incendiary cartridge which comprises:
a cylindrical housing incendiary material having a partially open end and a closed end;
an igniter charge in said housing;
a hollow frangible wall means having open ends, wherein one of said ends is fixedly attached to said partially open housing end;
a plurality of incendiary means annularly positioned within said frangible means;
means for trajectory improvement fixedly attached to said other frangible wall means end; and
means for fuzing, threadedly attached to said housing partially open end and intermediate to said trajectory improvement means and said plural incendiary means, for first igniting said igniter charge and said incendiary means upon impact of said cartridge, and then secondly for dispersing said ignited incendiary means in a combustible target area.

3,888,180
ROD WARHEAD
Eugene L. Nooker, San Luis Obispo, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.
Filed Nov. 6, 1968, Ser. No. 774,228
Int. Cl. F42b *13/48, 25/00*
U.S. Cl. 102—67 **11 Claims**



1. In a rod warhead having a casing provided with a side wall, a projectile on the side wall and comprising a plurality of rods, and a high explosive charge in the casing and confronting the rods,
a booster in the casing and engaging the high explosive charge,
and a safety and arming unit in the casing and having a detonator engaging the booster,
the booster having wall means within the casing, said wall means having at least one point disposed in angular relationship other than zero degrees to that portion of the side wall which lies beneath the rods, whereby the detonation wave produced upon initiation of said booster will impinge on the rods substantially uniformly throughout their lengths.

3,888,181
MUNITION CONTROL SYSTEM
Edward F. Kups, Los Angeles, Calif., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.
Filed Sept. 10, 1959, Ser. No. 839,264
Int. Cl. F42c *11/00*
U.S. Cl. 102—70.2 **2 Claims**



1. A munition safing, arming and firing system comprising means for transmitting a code consisting of pulses of differing frequencies, means for receiving said code, means for segregating the received pulses according to frequency, a stepping relay having a plurality of contact decks each of which corresponds to one of the frequencies contained in said code and

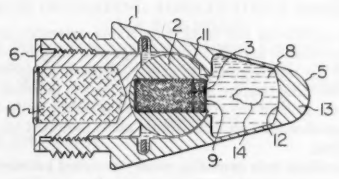
one additional contact deck, each of said contact decks having an associated wiper arm, said wiper arms being ganged for conjoint movement, means connected to said segregating means for applying ground potential to only one of the wiper arms of said plurality of contact decks in response to a pulse of the corresponding frequency, means interconnecting the contacts of said plurality of contact decks in correspondence with a preselected code, switch means for advancing said wiper arms one contact position in response to each pulse received by said receiving means, code check means connected to said interconnecting means for free-running said stepping switch back to its initial position after a predetermined time delay in response to a pulse which deviates from said preselected code, time delay means connected to said code check means for free-running said stepping relay back to its initial position after a predetermined time independently of the receipt of an incorrect pulse, arming circuit means connected to a predetermined contact of said additional contact deck, firing circuit means connected to a contact succeeding said predetermined contact and to said code check means so that upon the receipt of a correct series of pulses followed by an incorrect pulse the firing circuit will be activated through said code check means.

3,888,182

PRESSURE INITIATING PRIMER SYSTEM FOR PROJECTILES

David S. Breed, Boonton, N.J., assignor to Breed Corporation, Fairfield, N.J.

Filed July 11, 1973, Ser. No. 378,158
Int. Cl. F42c *1/10*
U.S. Cl. 102—73 R **10 Claims**



1. A pressure initiating primer construction for munitions comprising: a housing defining a sealed chamber, said chamber having a wall which is deformable in response to the striking of a target by said housing; a liquid substantially filling the chamber; and a pressure sensitive, sealed primer carried by said housing in intimate association with the liquid, whereby the striking of a target by said housing and the consequent deformation of said wall create a pressure pulse within the liquid which impinges on the primer with sufficient energy to initiate the primer.

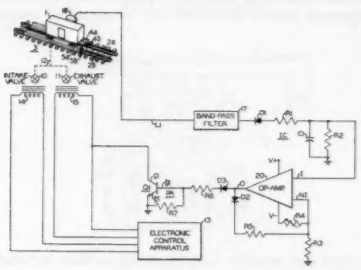
3,888,183

CONTROL SYSTEM FOR SUPPRESSING WHEEL SQUEALING NOISE PRODUCED BY RAILROAD CAR RETARDERS

Peter M. Noble, Valencia, Pa., assignor to Westinghouse Air Brake Company, Swissvale, Pa.

Filed June 28, 1974, Ser. No. 484,140
Int. Cl. B61b *1/00*
U.S. Cl. 104—26 A **11 Claims**

1. A system for controlling wheel squealing noises produced by an activated railroad car retarder comprising, transducer means located in the vicinity of the car retarder for producing electrical signals in response to sound waves, filter means coupled to said transducer means for passing a selected range of frequencies of said electrical signals, rectifier-integrator means coupled to said filtering means for sensing the time integral of said filtered electrical signals, comparator means connected to said integrator means for producing an output signal when the time integral exceeds a given value, and output means coupled to comparator means and responsive to said output signal for deactivating the car retarder thereby suppressing wheel squealing noises.

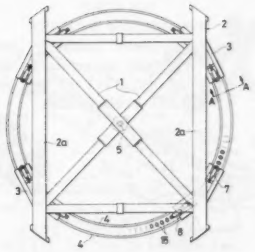


3,888,184

TURNTABLE

Kazuo Maeda, Chibashi, Japan, assignor to Mitsui Shipbuilding and Engineering Co., Ltd., Tokyo, Japan

Filed June 24, 1974, Ser. No. 482,553
Claims priority, application Japan, June 27, 1973, 48-76285
Int. Cl. B60s *13/02;* **B61j** *1/00*
U.S. Cl. 104—37 **1 Claim**



1. A turntable comprising circular rails provided on the ground, a frame for receiving a load mounted on said circular rails and turned along the rails, cylinder mechanisms provided in said frame so as to be extended and contracted tangentially to the circle of rotation, a plurality of holes provided along the rails, and means for engaging or disengaging a free end of each cylinder mechanism with one of said holes, whereby the frame can be turned by extension and contraction of said cylinder mechanisms and alternate engagement and disengagement thereof with said holes.

3,888,185

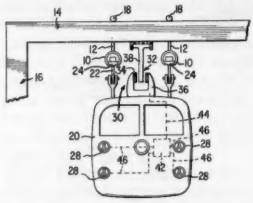
HIGH SPEED TRANSPORTATION SYSTEM

Robert Walsh, 3025 Cleveland Ave., N.W., Washington, D.C. 20008

Continuation-in-part of Ser. No. 190,765, Oct. 20, 1971, Pat. No. 3,774,542. This application Aug. 14, 1973, Ser. No. 388,161The portion of the term of this patent subsequent to Nov. 27, 1990, has been disclaimed.
Int. Cl.[2] B61B *3/02*
U.S. Cl. 104—89 **8 Claims**

1. A transportation system comprising track means comprising at least one substantially tubular track member extending along the length of the right of way to be traversed and

including a longitudinal slot in the underside thereof which extends the length of the track; means for supporting said track a predetermined distance above the surface of the earth, at least one vehicle; at least one elongate sled member slidingly disposed within said track for longitudinal movement



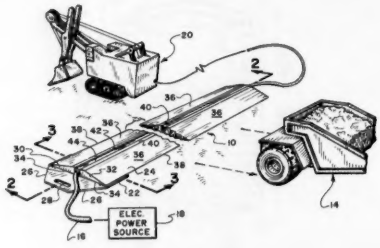
therein, said sled member having a lower surface substantially conforming in shape to the lower inner surfaces of said track adjacent said slot; means, connected to said sled through said slot and to said vehicle, for supporting said vehicle from said sled; and linear induction motor propulsion means for moving said vehicle along said track.

3,888,186

HIGH STRENGTH PORTABLE CABLE CROSSOVER FOR HIGH TONNAGE EARTH MOVING VEHICLES

David P. Jentzsch, Sandy; Hyrum T. Anderson, and Lee J. Olsen, both of Salt Lake City, all of Utah, assignors to Rubber Engineering, Inc., Salt Lake City, Utah

Filed July 30, 1973, Ser. No. 383,644
Int. Cl.[2] E01B *7/28*
U.S. Cl. 104—275 **5 Claims**



1. A ground-engaging cable crossover for out-of-doors use with heavy load earth moving vehicles weighing on the order of 200,000–400,000 pounds when loaded comprising:

a body of molded synthetic resinous material molded as one piece and having a durometer hardness sufficient to support excavating vehicle loads in excess of 200 tons and a length of not less than 8 feet;

said body comprising:

feathered front and back edges;

front and back tapered ramps, each extending from one said feathered edge to the center of the body and each defining a continuously flat horizontal bottom load bearing surface, an angular top surface diverging from said bottom surface in a direction away from the associated edge and a solid interior between said flat bottom and said angular top surfaces;

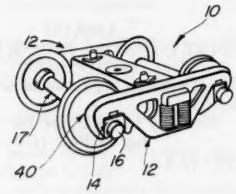
a central solid portion integrally of said one piece with each tapered ramp and bridging therebetween having a width substantially less than the width of either ramp, said central solid portion comprising a central continuously flat horizontal bottom load bearing surface linearly connecting one ramp continuously flat horizontal bottom surface with the other ramp flat bottom surface thereby creating a continuously flat horizontal load bearing crossover bottom surface and spaced generally horizontal top surface areas respectively joined to the adjacent ramp angular top surface, and a U-shaped recess spanning between said horizontal top surface areas and running the full length of the crossover for receiving an electrical cable by which an electrically driven excavator is powered, said recess having a vertical depth greater than the diameter of the cable, the spaced generally horizontal top surface areas and the solid material thereunder defining two support shoulders along the entire length of the crossover across which a ground-engaging vehicle having said weight load is displaced without deflecting said shoulders such as would impose vehicle load on the cable in the recess.

3,888,187

DAMPENED AXLE BEARING MOUNTING

John H. Van Moss, Jr., 3 Manor Lane, Highland Park, Ill. 60035

Filed Dec. 3, 1973, Ser. No. 421,404
Int. Cl. B61f *5/30, 5/38, 15/12*
U.S. Cl. 105—224.1 **4 Claims**



1. In a railroad car truck side frame assembly mounting standard axles in anti-friction bearings with adaptors the combination for improvement in axle suspension comprising:

a. a flat-back bearing mounted in a central position relative to the axle on top of the adaptor for sliding in the longitudinal direction on a horizontal plane mounted on the side frame,

b. a resilient axle centering means mounted between and in abutting contact with both the side frame and the adaptor and horizontally disposed in spaced relation to the axle, and

c. an axle snubbing means damping movement of the axle mounted between the side frame and the outer race of the anti-friction bearing.

3,888,188

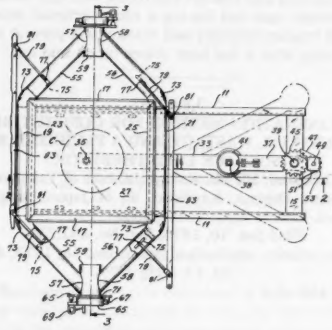
COMBINED PNEUMATIC AND GRAVITY HOPPER GATE CONTROLLED OUTLET

Oliver C. Fuller, Woodstock, Ill., assignor to Evans Products Company, Des Plaines, Ill.

Filed Apr. 25, 1974, Ser. No. 464,046
Int. Cl. B61d *7/20, 7/26;* **B65g** *53/46*
U.S. Cl. 105—282 R **8 Claims**

1. Hopper discharge means comprising means forming a downward discharge opening for a hopper having sloping walls, horizontal gate means closing said discharge opening, cylindrical pipes of uniform cross section disposed generally above said gate means and having their lower portions removed to accommodate the upper surface of said gate means and forming with said gate means parallel lading receiving conduits horizontally spaced apart and defining the opposite ends of said opening, said pipes being adapted to tangentially receive the sloping hopper walls irrespective of their angle of slope, the edges of said pipes adjacent said discharge opening being spaced above said gate to define, with the upper surface of the gate, lading inlet means in each of said lading receiving conduits and providing communication between said lading receiving conduits and said downward discharge opening,

suction conduit means comprising additional pipes of the same cross section as said first-named pipes forming suction conduits individual to each lading receiving conduit, and common suction nozzle means connected to both said individ-



ual suction conduits, said suction conduits converging toward each other for connection to said nozzle means and being curved tangential to said lading receiving conduits whereby to avoid the formation of angular intersections and consequent creation of turbulence in said conduits.

3,888,189

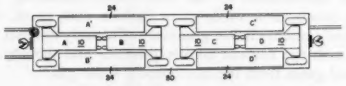
METHOD OF LOADING AGRICULTURAL MACHINES ON A RAILROAD

Merlyn Duane Bass, and Ralph August Gerhardt, both of Ottumwa, Iowa, assignors to Deere & Company, Moline, Ill.

Division of Ser. No. 354,994, April 27, 1973. This application May 16, 1974, Ser. No. 470,376

Int. Cl. B60p *7/08*

U.S. Cl. 105—367 R **2 Claims**



1. A method of shipping a plurality of agricultural machines on a railway car, having a width slightly greater than the width of the machines at the drive wheels, each machine having a transversely elongated removable header and a traction unit, with a fore-and-aft body mounted on a pair of forward drive wheels spaced outwardly from opposite sides of the body and a pair of rear caster wheels normally mounted on a rear axle structure on opposite sides and outwardly of the body, comprising: providing alternate mounting means for the caster wheels on the machine body adjacent the opposite sides; removing the headers from the plurality of machines; removing the caster wheels from their normal position on the axle and placing them in their alternate positions on the body on said machines; removing the axle structures; positioning at least one pair of the machines on the railway car, each pair being formed by positioning the traction units of two machines on a railway flatcar with their bodies in fore-and-aft alignment approximately at the fore-and-aft center line of the railway car and with the rearward ends of the traction units facing one another, and placing the headers for the two machines with the longitudinal dimension of the headers in a fore-and-aft direction on opposite sides of the traction unit bodies between the drive wheels of the opposite traction units.

3,888,190

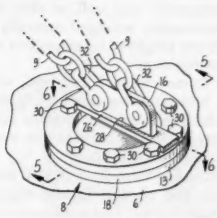
TIEDOWN LUG

Henry W. Bigge, 50 Marsh Pl., Oakland, Calif. 94611

Filed Jan. 10, 1974, Ser. No. 432,404

Int. Cl. B61d *45/00*

U.S. Cl. 105—475 **4 Claims**



1. A tiedown device adapted to be secured in place on the deck of a transportation device such as a barge, the device comprising a ring means secured directly to the barge deck and providing a receptacle, a circular plate mounted for rotation in the receptacle, said ring means having an inner peripheral portion extending inwardly over an outer peripheral portion of the circular plate to retain the circular plate in position for rotation, the circular plate having an upstanding flange providing attachment means between the tiedown device and an object on the barge, and a removable swivel locking plate carried by the circular plate and cooperable with the ring means to selectively secure the circular plate from rotating.

3,888,191

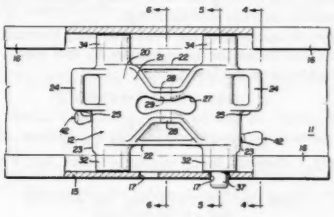
VEHICLE HOLDDOWN

Roland P. Jones, Westland, Mich., assignor to Cast Metal Industries, Inc., Farmington, Mich.

Filed July 15, 1974, Ser. No. 488,547

Int. Cl. B61d *45/00*

U.S. Cl. 105—477 **2 Claims**



1. In a vehicle holddown for use in slidably fitting and engaging within an upwardly opening channel having narrow, inwardly turned flanges formed on the upper edges of its legs, with the channel fixed upon a supporting deck, with the holddown formed of a roughly rectangularly shaped, hollow relatively flat body having a generally horizontally arranged upper wall and integral, downwardly extending side and end walls; with means formed on the upper wall for engagement with and end of a connector member whose opposite end is formed for engagement with a vehicle to be supported upon the deck and secured to the holddown; and transversely extending, hollow bosses, integral with the body side walls near the corners of the body to form a pair of axially aligned, journal forming members at each of the ends of the body, with the bosses each arranged to extend beneath its adjacent channel flange;

a horizontally accessed shaft slidably journalled through each pair of bosses, each shaft being retractable to fit within the body and bosses and being endwise slidable to

extend one end of the shaft a short distance transversely outwardly of one of its bosses for engaging within a preselected one of a number of spaced apart shaft receiving openings formed in one of the legs of the channel;

and each end wall being formed with an integral, approximately vertically arranged and longitudinally extending plate-like extension portion arranged roughly near the middle of its respective end wall, so that the extension portion is approximately arranged centrally of and normal to and is of the height of its respective end wall, the improvement comprising:

an L-shaped slot formed in each end wall, with each slot having a long, horizontal leg terminating near said one boss through which the shaft end extends outwardly, and a short upwardly extending leg which is located closely adjacent to said extension portion;

a pin-like lever extending through each slot, with each lever having an inner end portion fixedly engaged with its adjacent shaft and an outer end portion axially extending longitudinally of the body and normally extending at an upwardly directed acute angle, i.e., upwardly from its shaft towards the upper edge of its adjacent extension portion through the short slot leg when its shaft is retracted within the body and bosses, and with the free end of said lever outer portion generally arranged no higher than the upper edge of its extension and no further longitudinally outwardly than the free edge of its extension and being closely adjacent to its extension portion, wherein the lever outer end portion is normally protected by its closely adjacent portion;

and said lever outer portions each being swingable downwardly into the horizontal leg of its respective slot by means of a manually applied downwardly directed force upon its free end;

and a coil compression spring surrounding a portion of said shaft and having its opposite ends abutted against the shaft lever and a body portion for spring urging the shaft endwise to extend transversely outwardly of said one boss, wherein the lever slidably moves along the length of the long leg of its slot during endwise movement of the shaft, and wherein the shaft may be retracted by manually grasping the free end of the lever and also the extension portion and moving the lever along the slot long leg and upwardly into the slot short leg;

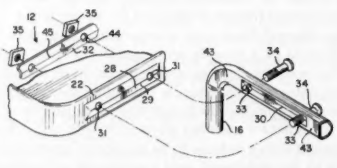
whereby an operator of the holddown may manually locate, grasp and move the lever blindly by feel alone, without actual view of the lever.

3,888,192

CART-LEG CONNECTION

Otis Basey, Columbus, Ind., assignor to Cosco, Inc., Columbus, Ind.

Filed Dec. 28, 1973, Ser. No. 429,379
Int. Cl. A47b 7/00
U.S. Cl. 108—156 **4 Claims**



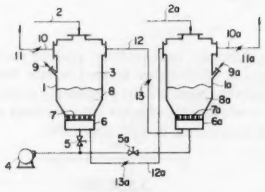
1. A shelf-leg connection for an article of metal furniture including a sheet-metal shelf having a peripheral border skirt lying in a plane normal to the general plane of said shelf and coupled to at least one leg formed of metal tubing, said connection comprising an outwardly projecting V-shaped rib formed in said skirt, said leg having a V-shaped recess formed therein generally corresponding in shape to the shape of said rib, a sheet-metal bracket having a V-shaped cross-section disposed along the inner face of said rib, said rib being matingly engageable between said bracket and recess, a bolt extending through aligned openings formed in said recess, rib, and bracket, and a nut drawn up on said bolt for bindingly interconnecting said bracket and recess with said rib disposed therebetween, said nut having a cross-sectional extent less than said bracket whereby said bracket will prevent said nut from turning after it has been drawn up on said nut.

3,888,193

INCINERATION METHOD FOR COMBUSTIBLE INDUSTRIAL WASTAGE AND A FLUIDIZED BED FURNACE USED THEREFOR

Kunio Kishigami; Hiroshi Kobayashi, both of Yokohama, and Shigenobu Oshima, Kawasaki, all of Japan, assignors to Babcock-Hitachi K.K., Tokyo, Japan

Filed Jan. 10, 1974, Ser. No. 432,239
Claims priority, application Japan, Jan. 16, 1973, 48-6642
Int. Cl. F23g 5/00
U.S. Cl. 110—8 F **8 Claims**



1. A method for incinerating combustible industrial wastage, comprising the steps of: fluidizing the combustible industrial wastage with cement clinker granules serving as a fluidizing medium; heating the fluidized combustible industrial wastage and cement clinker granules sufficiently to incinerate the combustible industrial wastage and thereby generate combustion waste gases from the combustible industrial wastage as it is incinerated, which combustible waste gases include acid gases; contacting the combustion waste gases thus generated by the incineration of the combustible industrial wastage, which combustion waste gases include acid gases, with the fluidized cement clinker granules sufficiently to react the acid gases with the cement clinker granules and thereby remove the acid gases from the combustion waste gas.

3,888,194

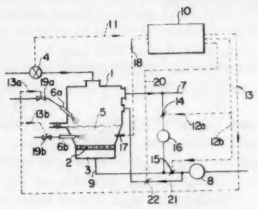
METHOD FOR INCINERATING INDUSTRIAL WASTAGE

Kunio Kishigami; Hiroshi Kobayashi; Toru Sente, and Koichi Sugiyama, all of Yokohama, Japan, assignors to Babcock-Hitachi K.K., Tokyo, Japan

Filed Feb. 28, 1974, Ser. No. 446,895
Claims priority, application Japan, Nov. 21, 1973, 48-130187
Int. Cl. F23g 5/12
U.S. Cl. 110—8 F **7 Claims**

1. In a method for incinerating combustible industrial wastage containing organic nitrogen compounds in a fluidized bed, wherein air for use in combustion is blown into a furnace from below to fluidized non-combustible fluidizing medium placed within said furnace, for forming a fluidized bed, and at the same time said combustible industrial wastage is supplied into said furnace from the upper portions thereof, which furnace has been preheated to a temperature above the combustion temperature of said combustible industrial wastage which is to be incinerated in said fluidizing bed, the improvements comprising the steps of: supplying combustible fuel material abundant in carbon content with said combustible industrial wastage into said fluidized bed; simultaneously maintaining the

interior of said fluidized bed in a reductive atmosphere and at a temperature higher than the combustion temperature of said fuel material and the combustion temperature of said combustible industrial wastage; incinerating said combustible industrial wastage in the reductive atmosphere in said fluidized bed and producing nitrogen oxides from the combustion of the



organic nitrogen compounds contained in said combustible industrial wastage and reducing the nitrogen oxides thus obtained from the organic nitrogen compounds within the reductive atmosphere of the fluidized bed and thereby removing the nitrogen oxides from the combustion gas produced by the combustion of said combustible industrial wastage and said fuel materials abundant in carbon content.

3,888,195

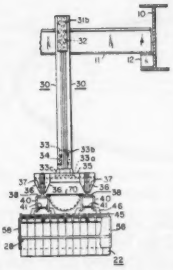
PANELIZED SUSPENDED BASIC FURNACE ROOF

Levi S. Longenecker, 61 Mayfair Dr., Pittsburgh, Pa. 15228

Continuation-in-part of Ser. No. 385,083, Aug. 2, 1973, Pat. No. 3,825,409. This application Apr. 26, 1974, Ser. No. 464,568

Int. Cl. F23m *5/02*

U.S. Cl. 110—99 R **24 Claims**



1. In an improved panelized suspended furnace roof construction for mounting on an overhead metal framework having spaced-apart substantially horizontally extending support members, downwardly extending post hanger members detachably suspended along the support members, a cross-extending yoke member carried by a lower end portion of each of said post hanger members, a pair of hanger supporting members suspended in a horizontally extending and spaced-apart relation with respect to each other from adjacent opposite ends of each of said yoke members, row pairs of tile-supporting hangers removably carried by said supporting members, and each of said hanger supporting members extending transversely with respect to its associated said yoke member and having a pair of spaced-apart latching portions therealong each of which is adapted to carry a row of said row pairs of tile-supporting hangers.

3,888,196

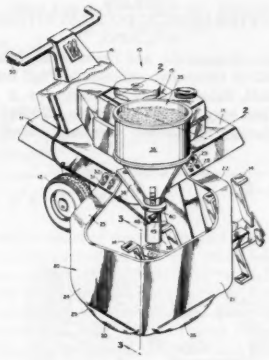
DISPENSING AND HOOD ASSEMBLY FOR ROTARY TILLER

William E. Glenn, R.F.D. #2, Carlton, Ga. 30627

Filed Jan. 31, 1974, Ser. No. 438,257

Int. Cl. A01c *7/08*

U.S. Cl. 111—10 **6 Claims**



1. A dispensing and hood assembly, for a rotary tiller including a platform, a plurality of spade members mounted for rotation with an axle, means for rotating the axle, and a handle for control of the tiller, including a front wall mounted from said platform forwardly of said spade members and substantially parallel to said axle, said front wall defining a forwardly turned lip at the lowermost edge thereof, a side wall disposed at one end of said axle and substantially at right angles with respect to said front wall, said front wall and said side wall being substantially vertically diposed and defining an incorporation chamber, and dispensing means carried by said rotary tiller generally above said incorporation chamber for dispensing material into said incorporation chamber.

3,888,197

DEVICES, SYSTEMS AND METHODS EMPLOYING KNITTED FABRIC MULCH

Robert T. Seitz, Tuscaloosa, Ala., and Otto M. Bundy, Bradenton, Fla., assignors to Gulf States Paper Corporation, Tuscaloosa, Ala.

Division of Ser. No. 333,782, Feb. 20, 1973, Pat. No. 3,848,359. This application Aug. 12, 1974, Ser. No. 496,764

Int. Cl. A01c *1/04*

U.S. Cl. 111—1 **3 Claims**

1. In a method of growing plants, wherein seeds are distributed over an area of the ground, the improvement comprising covering said seeds with an open-mesh knitted fabric consti-

tuted by a multiplicity of knittedly interconnected longitudinal and transverse yarn elements and having at least one porous irrigation tube between longitudinal yarn elements and interleaved with transverse yarn elements of said fabric, said tube being substantially wider than said yarn elements, and supplying water to said irrigation tube from an external source to irrigate seed seeds.

3,888,198

THREAD CUTTER DEVICE ON CHAIN STITCH SEWING MACHINE

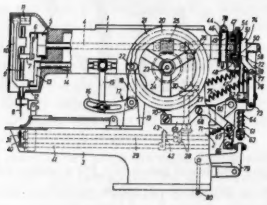
Wilhelm Bauer, Hauptstuhl, and Horst Stahlschmitt, Kaiserslautern, both of Germany, assignors to Pfaff Industriemaschinen GmbH, Kaiserslautern, Germany

Filed May 16, 1974, Ser. No. 470,543

Claims priority, application Germany, May 19, 1973, 2325564

Int. Cl. D05b *65/02*

U.S. Cl. 112—252 **3 Claims**



1. In a chain stitch sewing machine of the type having a rotating looper with a looper point and a looper back, a main shaft, a shaft for rotating the looper, means for driving the looper shaft from the main shaft and stopping mechanism for the main shaft adapted to substantially instantaneously stop said shaft in a predetermined angular position and including means permitting a slight over-run of said shaft and subsequent recoil of said shaft to said predetermined position, in which position the thread loop is held on the looper, an improved means for cutting the thread when the machine is stopped comprising knife means attached to the back of the looper and having a cutting edge spaced above the back of the looper and arcuately extending in the direction of the point of the looper, but substantially opposite the latter with respect to the axis of the looper shaft, whereby the recoil of the main shaft during stopping drives the looper in a reverse direction to apply the cutting edge of the knife means against a leg of the thread loop held on said looper to cut the thread.

3,888,199

METHOD OF MAKING A PRESS TAB CONTAINER END FROM A METALLIC WEB

Thomas R. Herrmann, Wheat Ridge, Colo., assignor to Coors Container Company, Golden, Colo.

Filed Dec. 3, 1973, Ser. No. 421,160

Int. Cl. B21d *51/00*

U.S. Cl. 113—80 R **13 Claims**

1. The method of making a press tab container end having a hinged pour opening closure tab and a hinged pressure release vent closure tab which comprises the steps of

a. forming in a metallic web an upwardly opening circular groove surrounding each of the proposed areas of a pour opening closure tab and a pressure release vent closure tab, and forming a rib located radially inwardly of each of said grooves,

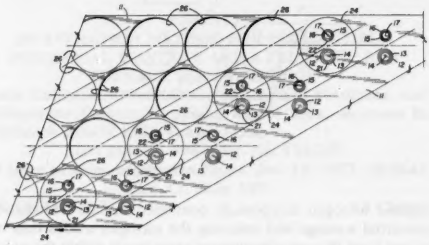
b. lancing the metal slightly inwardly of the top of said ribs to cut the tab areas from the web excepting where the tabs are joined hingedly to the web,

c. blanking out of the web a circular end including the two formed and lanced tabs,

d. drawing the peripheral portion of the blanked out end and forming a downwardly opening curved circumferential edge portion,

e. reforming the blanked out end to flatten and spread the tab areas,

f. coining the reformed end to make the tab edges underlie surrounding end areas,



g. subjecting the end to curling of the circumferential portion and insertion of gasket compound in the curled edge,

h. heating the end to temperature compatible with a sealant, and

i. applying the sealant to the heated end to cover the seam between the overlapping tabs and surrounding end surfaces to provide an air and fluid tight seal.

3,888,200

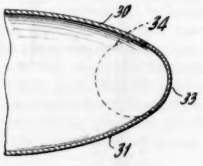
SHIP HULL CONSTRUCTION

Ovaldo Wendorf, 325 Broadway, Newark, N.J. 07104

Filed Feb. 8, 1974, Ser. No. 440,808

Int. Cl. B63b *1/32*

U.S. Cl. 114—56 **1 Claim**



1. The hull of a ship wherein below the water line the forward end portion of the bow is curved as seen in top cross-sectional view, wherein the said curve is a portion of a circle so that the bow is rounded, wherein the diameter of the said circle is at least one-third in length of the width of said hull at the hull's widest part, wherein said curved portion is a curved steel plate, the hull is constructed of steel side hull plates, said curved steel plate is connected to said side hull plate, and wherein the front of the bow below the water line is substantially vertical as seen in side view.

3,888,201

AUTO-PILOT

Bernard R. Zuvela, Fountain Valley, Calif., assignor to Scientific Drilling Controls, Newport Beach, Calif.

Filed Oct. 29, 1973, Ser. No. 410,713

Int. Cl. B63h *25/04*

U.S. Cl. 114—144 R **11 Claims**

2. An autopilot system for steering a craft, comprising:

a first pair of flux gate coils responsive to the earth's magnetic field and connected in series to have two end leads

at opposite ends of the coil series and a common lead between the coils;

a second pair of flux gate coils connected in series and also having two end leads and a common lead between the coils;

core means of magnetic material associated with said four coils respectively;

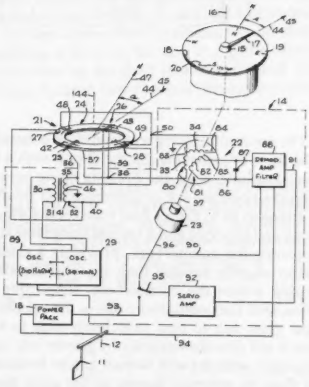
said four coils and said core means being adapted to be mounted on the craft in a predetermined orientation with respect to the heading of the craft, and to be fixed against rotation relative to the craft about a vertical axis;

the two coils of said first pair having axes extending in a common direction but being wound reversely to respond oppositely to a first component of the earth's magnetic field;

the two coils of said second pair having axes extending in a second common direction perpendicular to said direction of the first pair, and being wound reversely to respond oppositely to a second component of the earth's field perpendicular to said first component;

there being connected to each of said pairs of coils an alternating current power source, which may be the same source for both pairs, and which has two opposite end taps connected to said end leads respectively of the pair of coils and an intermediate tap between said end taps;

said alternating current being of a value to saturate said coils with flux on individual cycles and before reversal of



polarity of the alternating current, so that a first signal representing said first component of the earth's field is produced between said common lead of said first pair of coils and said intermediate tap of the associated power source, and a second signal representing said second component of the earth's filed is produced between said common lead of the second pair of coils and said intermediate tap of its power source;

a resolver having a first section and a second section mounted for rotation relative to said first section to positions representing different desired course directions;

one of said sections of the resolver having two coils offset ninety degrees electrically with respect to one another;

means for energizing said two coils of the resolver in accordance with the intensities of said first and second signals respectively to produce a resultant magnetic field in said one section of the resolver representing the earth's field; the other section of said resolver having coil means in which a third signal is induced representing any deviation of the directional orientation of said coil means from the direction of said resultant field produced by said coils of the first resolver section; and

power operated steering means responsive to said third signal to turn the craft toward a position bringing said coil means and said resultant field into alignment, and thereby bringing the actual heading of the craft into correspondence with the setting of the second section of the resolver relative to said first section.

3,888,202

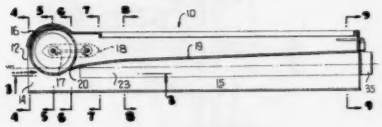
MARINE PROPULSION SYSTEM

James C. Willyard, 2211 Bucknell Ter., Silver Spring, Md. 20902

Filed July 5, 1973, Ser. No. 376,334

Int. Cl. B63h *11/02*

U.S. Cl. 115—16 **8 Claims**



1. In a marine vessel of the hull displacement type wherein the vessel hull is partially submerged when said vessel is in motion, a propulsion system comprising:

a flow duct extending along the bottom of said hull, said duct being open at both ends and closed along its top, bottom and side walls, said duct being mostly submerged with the upper portion of its forward end extending above the water line when said vessel is in motion;

a reaction device in the form of a rigid driven cylinder located at the forward end of said duct and entirely within the confines of said hull and proximate the forward end of said vessel, said cylinder having a longitudinal axis extending horizontally and perpendicular to the direction of vessel forward motion, the cylinder being positioned at a depth such that its periphery remains partially submerged during vessel motion, said cylinder having a smooth circumferential surface and arranged to be rotatably driven in a first direction about its longitudinal axis such that said circumferential surface viscously forces air and water under said cylinder and through said duct from forward of said vessel; and

means for selectively rotating said cylinder about said longitudinal axis in said first direction;

wherein said top wall of said duct extends from said cylinder to the stern of said vessel and has a leading edge positioned adjacent said cylinder at a level below the longitudinal axis of said cylinder and extending along the length of said cylinder near the water line of said vessel to direct water driven by said cylinder into said duct in a rearward flow direction;

wherein the bottom wall of said duct extends forwardly of said leading edge of said top wall of said duct at least as far as the forwardmost portion of said cylinder;

whereby water and air driven rearwardly through said duct by said cylinder initiates a reactive force which driver said vessel in a forward direction without imparting a lift force to said vessel.

3,888,203

STERN DRIVE FOR BOATS

Lawrence L. Lohse, Fond du Lac, Wis., assignor to Kiekhaefer Aeromarine Motors, Inc., Fond du Lac, Wis.

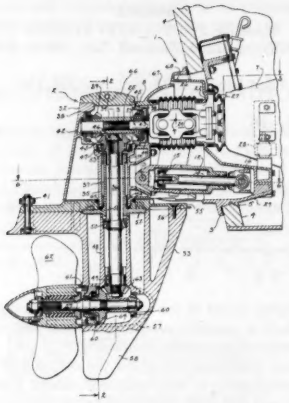
Filed Mar. 29, 1974, Ser. No. 455,998

Int. Cl. B63h *5/12*

U.S. Cl. 115—41 HT **23 Claims**

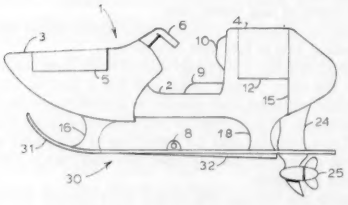
1. A stern drive for boats comprising a boat mounting assembly adapted to be secured to the transom of a boat and to provide a drive connection from an inboard engine; and a drive assembly removably secured to said boat mounting assembly and comprising a substantially vertical drive shaft having means connecting the same to said drive connection; an underwater dirigible unit suspended solely by said drive

shaft, a propeller carried by said unit and operatively connected to be driven by said shaft, said boat mounting assembly comprising a transom plate and a tilt housing pivotally secured to said transom plate on a transverse axis with adjustable trim



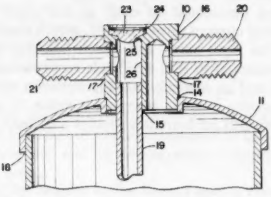
and power tilt mechanism therebetween, and said drive assembly being removably secured to said tilt housing to tilt therewith, and a double universal joint in said drive connection and substantially coincident to said transverse axis.

3,888,204
WATER SKI VEHICLE
Frank P. Zubick, Jr., 2848 South King St., Honolulu, Hawaii 96814
Filed June 8, 1973, Ser. No. 368,349
Int. Cl. B63h *5/00*
U.S. Cl. 115—70 **4 Claims**



1. An exposed passenger water vehicle comprising a relatively light main body hull, having upper portions of curvilinear cross sections transverse to a longitudinal axis, the hull having a relatively small cross sectional and elongated forward section and a relatively large cross sectional and short rearward section joined by a thin lower central section on which an occupant's seat is positioned, the forward section having a relatively rectangular cavity extending downward from an upper surface of the section for receiving a similar shaped gas tank, means for mounting an outboard engine housing within the rear section, whereby a drive shaft and propeller of the engine extend downward from the rear section, turnable steering means extending upward and rearward from the front portion and turnable shaft means extending downward and forward into the front section from the turnable steering means and connecting means extending rearward from the shaft to the rear section for turning the outboard engine and thereby steering the vehicle, a front strut extending downward from the front section, and a rear strut extending downward from the rear section, and a relatively heavy ski extending fore and aft from lower ends of the struts and rigidly secured thereto, and keel means extending rearward along a central, after portion of the bottom surface of the ski.

3,888,205
ARTICLE HAVING A SIGHT GLASS AND METHOD OF MAKING THE SAME
Julius M. Vitticore, Clyde, N.Y., and David N. Mooney, Moreland Hills, Ohio, assignors to Parker-Hannifin Corporation, Cleveland, Ohio
Filed Nov. 12, 1973, Ser. No. 415,178
Int. Cl. C03c *27/02*
U.S. Cl. 116—117 C **8 Claims**



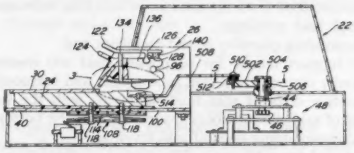
1. The method of fusing a glass disk to a metal part comprising the steps of providing the metal part with a bore, an opening and a counterbore, the opening being between and intersecting the bore and the counterbore and smaller in diameter than either so as to form a first transverse surface between the opening and the bore and a second transverse surface between the opening the counterbore, providing a glass disk having a diameter slightly smaller than the counterbore, placing the glass disk within the counterbore, supporting said part in a position with the counterbore above the opening, and subjecting the glass disk to heat sufficiently high to soften the glass so that it will flow downwardly by gravity into the opening into engagement with the wall thereof and be limited in such downward flow by cohesive forces in the glass that substantially prevent the glass from flowing radially outwardly along said first transverse surface and whereby a portion of the softened glass disk will remain in the counterbore and gravity will cause it to flow radially outwardly into contact with the wall of said counterbore and become fused thereto.

7. An article of manufacture comprising a metal part having a bore, an opening, and a counterbore, the opening being between the bore and counterbore and smaller in diameter than either and being about one-half the diameter of the counterbore, a first transverse surface between the bore and opening having a radial width of at least 0.020 inch and intersecting the opening at a corner of substantially no more than 0.005 inch brake and making an angle with the wall of said opening of no more than about 90°, a second transverse surface between the opening and a circumferential wall of the counterbore and lying in a cone, and a glass disk in said counterbore and opening and fused to the circumferential walls thereof and to said second transverse surface, the disk extending to said first transverse surface but not appreciably radially overlapping the same, and said disk where fused to said counterbore circumferential wall having a meniscus also fused to said counterbore circumferential wall, the meniscus being on the side of the disk remote from said opening and axially spaced from the end of the counterbore remote from the opening.

3,888,206
AUTOMATIC BLOOD SMEAR DEVICE WITH VIBRATION DAMPING MEANS

Albert A. Faulkner, Conshohocken, Pa., assignor to Geometric Data Corporation, Wayne, Pa.

Filed Aug. 29, 1974, Ser. No. 501,719
Int. Cl. B05c *11/04*
U.S. Cl. 118—100 9 Claims

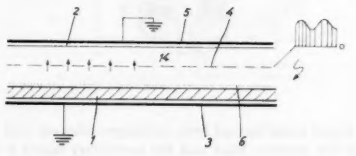


1. In a smearing device for slides including holding means for supporting a slide, spreading means in contact with the slide and translation means for causing relative linear movement between the slide and the spreading means, said translations means including a motor rotating a shaft, the improvement comprising a linkage assembly for converting the rotation of the shaft to linear relative movement between the slide and the spreading means, said linkage assembly comprising a crank arm coupled to said holding means and freely rotatable on said shaft, bracket means fixedly secured to said shaft and adapted for applying a force to the arm at a point thereon to cause the arm to rotate as the shaft rotates and shock absorbing, resilient means located between said bracket and said arm at said point.

3,888,207
DEVICE FOR COATING OBJECTS WITH PULVERIZED OR GRANULAR PARTICLES OR FLAKES OR FIBRES

Erwin Stutz, Wetzgauerstrasse, Mutlangen, and Hugo Brennenstuhl, Seestr. 1-3, Tübingen-Pfrondorf, both of Germany

Filed July 24, 1972, Ser. No. 274,614
Int. Cl. B05c *5/02*
U.S. Cl. 118—621 10 Claims

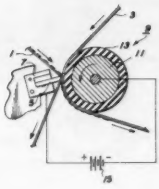


1. A device for coating objects with small particles on a collecting element which comprises an insulating support means for such particles, means to agitate particles on the support, a first electrode member on one side of said support means, a counter-electrode member on the other side of the support means from said first electrode member, said counter-electrode member having spaces therethrough, said agitating means comprising means to create a first alternating current electrostatic field between the first electrode member and the counter-electrode member to displace particles from said support means, and means to create a second electrostatic field between the counter-electrode member and a collecting element on the opposite side of the counter-electrode member from the support means, said last means comprising means to charge said counter-electrode member and said collecting element with different potentials, whereby to deposit particles from said support means on such collecting element.

3,888,208
IMAGE TRANSFER PROCESS

Robert E. Gerace, Fairport; William L. Gary, Lyons, and Charles J. Hull, Jr., Fairport, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 28, 1973, Ser. No. 429,247
Int. Cl. G03g *13/16*
U.S. Cl. 118—637 10 Claims

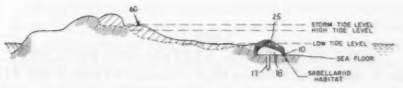


1. An image transfer device which comprises an electrically conductive round tip blade in juxtaposition to an electrically conductive backup roller adapted to accept under pressure an image bearing medium and an image receiving medium therebetween, means to apply an electrical bias between said blade and said roller, said tip having a radius of from about 0.05 inches to about 0.1 inches, said blade being mounted at an angle to the horizontal plane of the axis of said roller and said roller and media being driven in the same direction.

3,888,209
ARTIFICIAL REEF

Edmund R. Boots, 2310 Ocean Dr., Vero Beach, Fla. 32960

Filed Nov. 14, 1973, Ser. No. 415,690
Int. Cl. A01k *61/00*; E02b *3/04*
U.S. Cl. 119—1 4 Claims

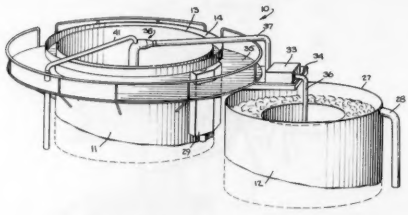


1. A method for protecting a shoreline against undesirable erosion by positioning an artificial reef offshore to serve as a favorable habitat for sabellariid marine organism, comprising the steps of submerging a plurality of solid one-piece base reefs substantially end-to-end on the seabed adjacent and oblique to the shoreline, such that one end of the artificial reef is closer to the shoreline than the other end, each of said base reefs having an upper crown portion and a pair of spaced depending sidewalls each forming a substantially continuous interface surface extending from the seabed to the top of said reef, the lower ends of said sidewalls being adapted to be set on the seabed to define a chamber extending the length of the base reef between the seabed and the interior surface area of said sidewalls and said crown, said base reefs having an opening into said chamber in said crown to provide access to the chamber for sand and water, the mean water level relative to the seabed at the points of placement of said base reefs being no less than the height of the artificial reef, and permitting the sabellariid organisms to form an upper reef on said base reefs.

3,888,210
FISH HUSBANDRY SYSTEM UTILIZING AT LEAST PARTIAL RECIRCULATION OF WATER

Keen W. Buss, Boalsburg, Pa., assignor to Marine Protein Corporation, Londonderry, Rockingham, N.H.

Continuation-in-part of Ser. No. 228,016, Feb. 22, 1972, abandoned. This application Feb. 28, 1974, Ser. No. 446,970
Int. Cl. A01k *63/00*
U.S. Cl. 119—3 10 Claims

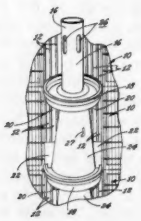


1. Apparatus for intensive rearing of fish in a controlled environment for human consumption utilizing reuse of the water comprising at least one vertically extending fish rearing tank adapted for bottom to top relatively uniform substantially laminar upward water flow having an exit water overflow trough around its upper portion, means associated therewith including a reconditioning tank having an outer wall, an inner filtrate compartment, and an interstitial filter compartment defined by said filtrate compartment and said outer wall and containing filtration media therein, said filter compartment having respective inlet and exit means, first water conduit means interconnecting said overflow trough with said inlet means, said exit means communicating with said filtrate compartment, second water conduit means interconnecting said filtrate compartment with said rearing tank, pump means associated with said second water conduit means for pumping reconditioned water from said filtrate compartment to said rearing tank, oxygenation hood means disposed in said rearing tank having an upper inlet means and a lower exit means disposed adjacent the bottom interior portion of said tank, fresh water conduit means and said second water conduit means connected to said hood inlet means and degasification chamber means interposed in said first water conduit means for removing gaseous contaminants from said exit water.

3,888,211
POULTRY RAISING SYSTEM AND PROCESS

John A. Allen, 1674 Valley High, Thousand Oaks, Calif. 91360

Continuation-in-part of Ser. No. 230,838, March 1, 1972, abandoned, which is a continuation-in-part of Ser. No. 179,890, Sept. 13, 1971, abandoned. This application Jan. 23, 1974, Ser. No. 435,807
Int. Cl. A01k *39/00*
U.S. Cl. 119—18 23 Claims



1. Growth apparatus for fowl, or the like, comprising:

a container having tiers of enclosed compartments disposed vertically above one another;

vertical feed tube means extending between said tiers and having feed openings therein at levels corresponding to the interior of the individual compartments;

a plurality of feed trays;

first support means for supporting said feed tube means and said trays coaxially with respect to each other, with said trays being spaced along said feed tube means and under respective ones of said openings in said feed tube means, to receive feed from the interior of said feed tube means through said openings;

a corresponding plurality of silo members and;

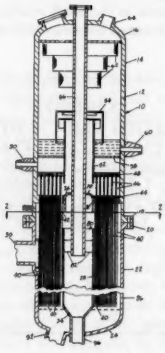
second support means for supporting said silo members coaxially circumjacent said tube means and surrounding respective ones of said feed openings, with the lower edges of said silo members spaced up from the bottom of the corresponding ones of said trays; and

each of said trays having a dish-shaped configuration and including an upstanding peripheral rim surrounding the lower edge of the corresponding silo member.

3,888,212
LIQUID METAL STEAM GENERATOR

Walter Wolowodiuk, New Providence, N.J., assignor to Foster Wheeler Corporation, Livingston, N.J.

Filed Oct. 24, 1972, Ser. No. 300,012
Int. Cl. F22b *1/06*
U.S. Cl. 122—32 7 Claims



1. A liquid metal heated heat exchanger wherein said liquid metal is the primary fluid and the secondary liquid is water which will react violently with the liquid metal if it should contact the metal, comprising:

an inner cylinder;

an outer cylinder coaxial with and encircling said inner cylinder, the top of said outer cylinder being higher than the top of said inner cylinder;

a primary fluid inlet for admitting fluid in the upper portion of the space between the inner cylinder and said outer cylinder;

a primary fluid outlet for allowing said primary fluid to pass out of the annular space between said inner cylinder and said outer cylinder;

heat exchange tubes for carrying secondary fluid to be heated by said primary fluid, said heat exchange tubes extending parallel to said inner cylinder and said outer cylinder in the annular space between said inner cylinder and said outer cylinder;

a relief pipe extending down into said inner cylinder, the bottom of said pipe being below the top of said cylinder;

a centrifugal separator positioned in the annular space between said relief pipe and said inner cylinder;

whereby in the event of a failure of one of said heat exchange tubes resulting in a reaction between said primary fluid and said secondary fluid, the products of said reaction will flow upwardly over the top of said inner cylinder and then downwardly through said cylindrical separator so that the heavier products of said reaction will be thrown outwardly and against said inner cylinder and the gaseous products of said reaction will be in the central portion of said inner cylinder to be free to move upwardly through said relief pipe.

3,888,213
BOILERS

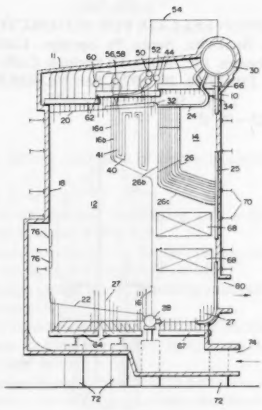
Nuri Uygun Akturk, Cheltenham, and Ronald Arthur Ashdown, Redhill, both of England, assignors to Foster Wheeler Corporation, Livingston, N.J.

Filed Mar. 15, 1974, Ser. No. 451,711

Claims priority, application United Kingdom, Mar. 15, 1973, 12617/73

Int. Cl.[2] F22G *7/14;* **F22D** *1/02*

U.S. Cl. 122—478 **7 Claims**



1. A natural circulation steam boiler comprising:

a furnace enclosure,

water tube walls defining said furnace enclosure, said walls having upper and lower ends,

an upper steam drum,

tube means connecting said upper ends to said steam drum, a lower distribution header,

tube means connecting said lower distribution header and said lower ends,

downcomer tubes extending between said drum and said header, and,

a convection bank of evaporating tubes, said tubes being connected directly to said downcomer tubes at locations on said downcomer tubes between said drum and said header,

whereby the provision of a lower water drum in said steam boiler is obviated.

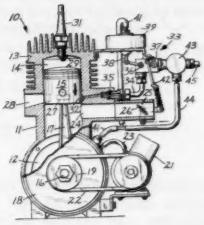
3,888,214
FUEL INJECTION SYSTEM FOR TWO CYCLE ENGINE

Gerald D. Reese; Gerald G. Shank, both of Roseau, and Lowell D. Carlson, Pencer, all of Minn., assignors to Textron Inc., Providence, R.I.

Division of Ser. No. 58,431, July 27, 1970, Pat. No. 3,707,143. This application June 1, 1972, Ser. No. 258,805

Int. Cl. F02b *15/00;* **F02m** *69/10*

U.S. Cl. 123—32 A **10 Claims**



1. A method of low pressure injection of ignitable fuel under the combustion chamber of an internal combustion engine operable through cycles of intake, compression, combustion and exhaust and which includes piston means sealably movable to vary the volume of the combustion chamber, means for supplying air to the combustion chamber during the intake cycle and means for exhausting combustion gases from the combustion chamber during the exhaust cycle, comprising:

a. supplying to and accumulating a discrete quantity of fuel sufficient to produce engine combustion in a storage cavity the entirety of which is sufficiently close to the combustion chamber to permit free and instantaneous discharge of the entire quantity of fuel therefrom into the combustion chamber, said quantity of fuel being supplied and accumulated at a time other than during the intake cycle;

b. blocking fluid communication between the combustion chamber and the storage cavity for a time other than during the intake cycle;

c. establishing fluid communication between the combustion chamber and the storage cavity during the intake cycle to release the entire accumulated quantity of fuel from the storage cavity and permit free and instantaneous discharge into the combustion chamber;

d. and supplying air to the combustion chamber separately from the accumulation of said quantity of fuel, said quantity of fuel and air being subsequently mixed in the combustion chamber for ignition and combustion therein.

3,888,215
FUEL-AIR MIXTURE CONTROL

Paul E. Maier, 3817 Runnels, Fort Worth, Tex. 76106

Filed July 16, 1973, Ser. No. 379,611

Int. Cl. F02b *3/00*

U.S. Cl. 123—32 EA **1 Claim**

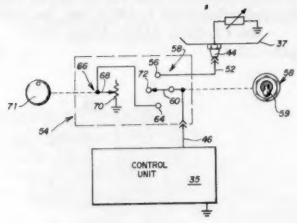
1. In combination with a fuel injection system for a vehicle engine of the type wherein a temperature responsive variable resistance transducer is placed in contact with the engine, the transducer varies in resistance and is connected to a fuel control means to vary the amount of fuel injected into the engine in response to the temperature of the engine, the improvement which comprises:

a. a variable resistor means adjustable within the operating range of said transducer;

b. triple throw switch means which when engaged can selectively:

1. connect said variable resistor means to said control means whereby the operator of the vehicle may manipulate the variable resistor means to control the amount of fuel injected into the engine,

2. connect said transducer to said control means, and
3. disconnect said control means and said variable resistor means from said transducer whereby starting of the engine is prevented; and



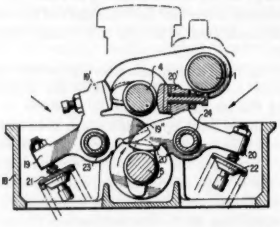
c. said variable resistor means and said switch means are positioned on said vehicle so that the operator thereof can manipulate said variable resistor means and said switch means while operating said vehicle.

3,888,216

SYSTEM FOR THE CONTROL OF THE INTAKE AND EXHAUST VALVES OF INTERNAL COMBUSTION ENGINES

Stevan Miokovic, Paris, France, assignor to Regie Nationale des Usines Renault and Societe dite: Automobiles Peugot, France

Filed Oct. 2, 1973, Ser. No. 402,917
Claims priority, application France, Dec. 1, 1972, 72.42860
Int. Cl. F01l *1/34*
U.S. Cl. 123—90.15 **4 Claims**



1. A system for the control of the intake and exhaust valves of internal combustion engines which permits the automatic variation, during engine operation, of valve overlap and the respective open angles thereof comprising, in conjunction with engine intake and exhaust valves:

two camshaft means for respectively lifting and closing said engine intake and exhaust vauves;

said camshafts having mutually adjustable timing means for adjusting the timing angles of said valves; and

a pair of rocker arms operated by said camshafts, and each of said rocker arms having two cam follower means thereon for respectively contacting cam means upon each of said camshafts.

3,888,217

CAMSHAFT BELT DRIVE FOR VARIABLE VALVE TIMING

Charles A. Hisserich, 447 Cabrillo St., Costa Mesa, Calif. 92627

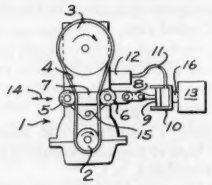
Filed Sept. 24, 1973, Ser. No. 400,125
Int. Cl. F01l *1/02*
U.S. Cl. 123—90.31 **2 Claims**

1. In an internal combustion engine having a crankshaft and a camshaft, toothed pulleys on each said shaft and a timing belt having internal teeth connecting said pulleys and having excess length;

a pair of idler pulleys bearing against intermediate free portions of said belt to take up said excess length;

a displaceable yoke carrying said idler pulleys; and

means to displace said yoke to vary the angular relation between said toothed pulleys and thereby vary the valve timimg of said engine,



said means comprising a vacuum-responsive element and a speed-responsive element adapted to produce linear displacements and both connected mechanically in series to said yoke to thereby displace said yoke as a function of the sum of their individual displacements,

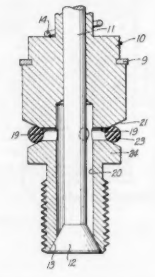
whereby said valve timing is varied as a function of both speed and of intake manifold vacuum.

3,888,218

COMPRESSION RELEASE FOR MOTORCYCLE ENGINES

Everett D. Bonewitz, Santa Fe Springs, Calif., assignor to Victor Plastics, Inc., Santa Fe Springs, Calif.

Filed Dec. 26, 1973, Ser. No. 428,040
Int. Cl. F01l *13/08*
U.S. Cl. 123—97 B **8 Claims**



1. In a compression release for an internal combustion engine of the type having a body with a chamber therein connected to the engine, a valve member operable to open and close the connection between said chamber and engine, and at least one outlet opening in said body for venting gases passing into said chamber from the engine when said valve member is open, the improvement comprising a resilient high temperature and corrosion resistant annular O-ring overlying said outlet opening, said O-ring being mounted in a complementary groove extending around the outer periphery of said body, said outlet opening intersecting the inner most portion of said groove, said O-ring normally sealing off said outlet opening to prevent contaminants from entering said chamber, said O-ring and groove being constructed and arranged so that said O-ring is movable outwardly under the sudden application of high pressure from gases moving into said chamber when said valve member is open without said o-ring becoming unseated from said groove, said O-ring automatically flexing back to its normal position sealing said outlet opening when

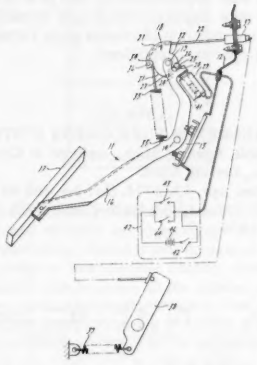
the pressure in said chamber is removed, said O-ring acting as a check valve to prevent the reverse movement of gases and impurities into said engine.

3,888,219

THROTTLE LINKAGE INCLUDING AN OVERSPEED PROTECTIVE DEVICE

Jerry B. Rogerson, Dearborn, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed June 10, 1974, Ser. No. 478,020
Int. Cl. F02d *11/04*
U.S. Cl. 123—97 R **13 Claims**



1. A linkage for the operation of a remote element including:
an actuating lever,
a fulcrum means pivotally supporting said actuating lever for movement about a first axis,
a pulley mounted on said lever for pivotal movement about a second axis spaced from said first axis,
a flexible linkage means interconnecting said pulley and the remote element,
spring means biasing said pulley toward a normal position,
latch means locking the pulley in said normal position relative to said lever,
said latch means being releaseable to permit said pulley to rotate relative to said lever when the tension of said flexible linkage exceeds that of said spring means.

3,888,220

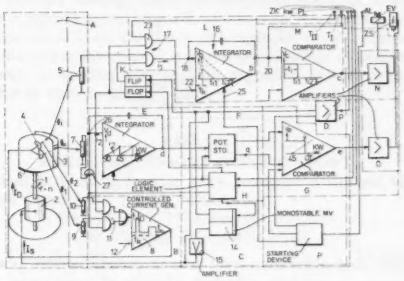
INTERNAL COMBUSTION ENGINE PERFORMANCE CONTROL SYSTEM

Erhard Bigalke, Wolfsburg; Dietrich Radmann, Flechtorf; Erwin Klein; Rainer Melichar, both of Regensburg, and Kurt Biedermann, Stallwang, all of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed Aug. 28, 1973, Ser. No. 392,188
Claims priority, application Germany, Aug. 29, 1972, 2242477
Int. Cl. F02p *5/08*
U.S. Cl. 123—117 R **31 Claims**

1. A performance control system for a spark-ignited, internal combustion engine that uses at least two operating parameters of the engine for adjustment of the engine ignition spark advance, the ignition advance being dependent upon at least one characteristic performance curve of values that vary as a function of the operating parameters, said system comprising, in combination:

a. information storage means for storing the characteristic performance curve values;
b. information receiver means, connected to said storage means and responsive to the operating parameters, for extracting from said storage means a curve value associated with specific operating parameter values and producing an electrical signal having an amplitude related to said determined curve value;
c. analyzer means connected to said information receiver means for receiving said signal and producing electrical pulses having duration times related to said signal amplitude, said analyzer means including:
1. integrator means for receiving said signal during a predetermined crankshaft angle of rotation and producing an integrated voltage output;



2. time-controlled storage means, connected to said integrator means, for storing said integrated voltage output; and
3. comparator means connected to said time-controlled storage means for receiving and comparing said integrated voltage output to an increasing voltage signal of predetermined slope beginning at the end of said predetermined crankshaft angle of rotation, and producing an electrical pulse when said increasing voltage signal equals said integrated voltage output; and
d. control means connected to said analyzer means for triggering said engine ignition in response to said electrical pulse.

3,888,221

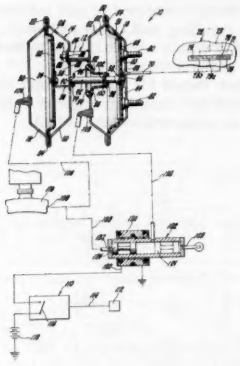
CONSTANT SPEED RESPONSIVE SPARK CONTROLLER

Thomas A. Stacey, Jr., Fenton, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 25, 1974, Ser. No. 463,877
Int. Cl. F02p *5/08*
U.S. Cl. 123—117 A **4 Claims**

1. A spark advance controller for the ignition distributor in an internal combustion engine having a contact set carried by a movable breaker plate to adjust the contact set with respect to distributor cam means to control the spark advance from the distributor to spark plugs for igniting a combustible air-fuel mixture in the cylinders of the internal combustion engine comprising: main vacuum operator means including a movable diaphragm defining a main vacuum chamber, boost vacuum operator means including a second movable diaphragm forming a boost vacuum chamber, each of said main and boost vacuum chambers including a signal port thereto, means for communicating said main vacuum chamber port with the intake manifold of an internal combustion engine, a distributor spark advance lever having first and second control positions for producing a staged advance of a spark from a distributor, coupling means for connecting said spark advance lever to each of said first and second movable diaphragms, said first movable diaphragm and said coupling means being responsive to reduced intake manifold pressure produced during engine operation to move said advance lever into its first control

position to effect a first spark advance from the engine distributor, and signal producing means for directing a boost vacuum signal to said boost vacuum chamber upon the occurrence of a constant vehicle speed to operate said coupling means to



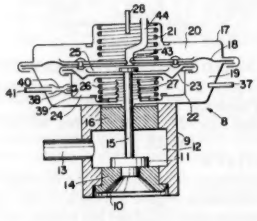
move said distributor lever into its second control position thereby to produce a further advance of spark under road load, constant vehicle speed conditions to produce a resultant improvement in fuel economy without engine detonation.

3,888,222

EXHAUST GAS RECIRCULATION

Tsutomu Tomita, Okazaki, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Aug. 20, 1974, Ser. No. 499,090
Claims priority, application Japan, Oct. 2, 1973, 48-110194
Int. Cl. F02m *25/06*
U.S. Cl. 123—119 A **3 Claims**



1. A system for controlling recirculation of exhaust gases from an exhaust manifold to an intake manifold in an internal combustion engine, a throttle valve of the engine being provided upstream of the intake manifold, comprising, in combination:

a recirculation passage connected between the exhaust manifold and the intake manifold;

a valve disposed in said recirculation passage including a valve member disposed such that the volume of gases flowing in said recirculation passage is proportional to the displacement of said valve member;

a first diaphragm box, said first diaphragm box being divided by a first diaphragm into a first diaphragm chamber and a second diaphragm chamber, means communicating said first diaphragm chamber with the surrounding atmosphere and means communicating said second diaphragm chamber with said intake manifold upstream of the throttle valve;

a second diaphragm box attached to said first diaphragm, said second diaphragm box being divided by a second diaphragm into a third diaphragm chamber in communication with the surrounding atmosphere and a fourth diaphragm chamber in communication with the intake manifold downstream of the throttle valve, displacement of said first diaphragm in a first direction being caused by vacuum pressure admitted in said second chamber, and displacment of said second diaphragm in an opposite direction being caused by vacuum pressure admitted into said fourth diaphragm chamber; and

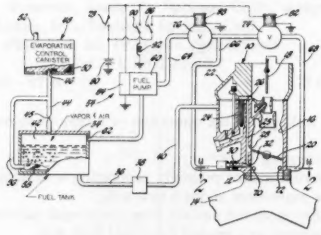
means connecting said second diaphragm to said valve member such that the degree of opening of said recirculation passage due to displacement of said valve member increases with displacement of said first diaphragm and decrease with displacement of said second diaphragm, whereby recirculation of exhaust gases varies in response to engine operating conditions.

3,888,223

CARBURETOR ENRICHMENT SYSTEM

James R. Mondt, Pontiac, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 12, 1974, Ser. No. 460,507
Int. Cl. F02m *17/08;* **F02b** *77/00;* **F02n** *17/00*
U.S. Cl. 123—136 **5 Claims**



1. A gasoline vapor carburetor enrichment system for association with a carburetor having a bore therethrough with one open end adapted to be connected to an air cleaner and an opposite open end adapted to supply an air-fuel mixture to the intake manifold of a vehicle and including a throttle valve located above the intake manifold for regulating air-fuel flow into the intake manifold comprising: a plurality of vapor ports in said carburetor bore below said throttle plate, a gasoline tank having a vapor space therein and a vent conduit therefrom, a canister including means for adsorbing fule vapors, said canister including an atmospheric vent and an inlet in communication with said vent conduit to receive fuel vapors from the tank and to adsorb said vapors within said canister, means for withdrawing vapors from said tank and said canister for a predetermined time prior to engine cranking for discharge through said plurality of vapor ports under engine start conditions to produce a precharge of vaporized fuel and air in the intake manifold to improve engine ignition under cold start conditions, said means for withdrawing vapors from said tank and said canister for discharge through said ports being operative to reduce the flow of vapor and air to said ports upon engine ignition, and means responsive to a predetermined increase in engine temperature to terminate flow of vapors from said gasoline tank and said evaporated canister to said ports.

3,888,224
LIQUID FOOD PRESERVATION

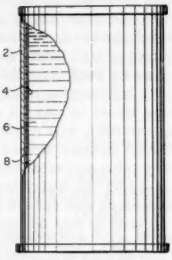
Akira Okuhara; Masatoshi Saiki, both of Noda, and Nobuo Saito, Naygareyama, all of Japan, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Continuation-in-part of Ser. No. 17,059, March 6, 1970, abandoned. This application Oct. 26, 1972, Ser. No. 300,979

Claims priority, application Japan, May 30, 1969, 44-41653; Dec. 19, 1969, 44-101612

Int. Cl. B65d *25/14, 25/34*

U.S. Cl. 426—126 **18 Claims**



1. A metallic container containing melanoidin-containing liquid food and suitable for preserving and decolorizing melanoidin-containing liquid food contained therein, said container having an intermediate coating consisting of non-metallic material which covers all the interior surface of said container and an interior coating thereon of at least one metal selected from the group consisting of Al, Mn, Mg, and Zn, said metal being in direct contact with the melanoidin-containing liquid food.

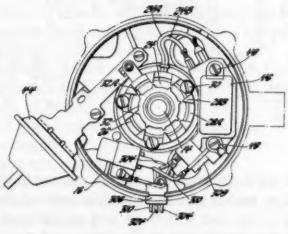
3,888,225
INTERNAL COMBUSTION ENGINE IGNITION CONTROLLER

James A. Boyer, Anderson, and Charles L. Dusenberry, Chesterfield, both of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Sept. 26, 1973, Ser. No. 401,043

Int. Cl. F02p *1/00*

U.S. Cl. 123—148 E **10 Claims**



1. An ignition controller for an internal combustion engine comprising, a base member, a magnetic pick-up supported by said base member comprising, a pick-up coil and a permanent magnet, a rotor formed of magnetic material rotatable with respect to said base member, a magnetic circuit providing a path for flux linking said pick-up coil comprising said rotor and permanent magnet and including at least one air gap which varies as a function of rotor position whereby an alternating control voltage is induced in said pick-up coil when said rotor is rotated, an ignition coil supported from said base member spaced from said magnetic pick-up, said ignition coil having a magnetic core provided with an air gap, said core carrying the primary and secondary windings of said ignition coil, and ignition control means comprising a switching means, means connecting said pick-up coil and said switching means for causing said switching means to be biased substantially conductive when said alternating control voltage has a first polarity and substantially non-conductive and said alternating control voltage has a second opposite polarity, means connecting said switching means and said primary winding whereby said primary winding is energized when said switching means is conductive and is substantially deenergized when said switching means is substantially non-conductive when said switching means and primary winding are operatively connected to a voltage source, said air gap of said core of said ignition coil being so positioned with respect to said magnetic circuit that the leakage flux developed during energization of said primary winding across the air gap of said ignition coil core is applied to said magnetic circuit in such a direction and magnitude as to aid the flux in said magnetic circuit provided by said permanent magnet in generating a voltage of said first polarity to thereby prevent false triggering of said control means by stray magnetic fields.

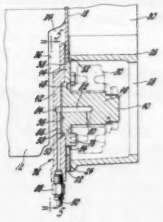
3,888,226
ENGINE ACCESSORY DRIVE SUPPORT

Michael A. Wallace, Pontiac, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 19, 1973, Ser. No. 417,263

Int. Cl. F02f *7/00;* **F02b** *77/14*

U.S. Cl. 123—195 A **2 Claims**



1. In combination, an internal combustion engine including accessory drive means and comprising

an engine block assembly having an end plate mounted on one end of said block, said end plate having an accessory drive mounting portion adjacent one edge of said block, and including an opening for receiving accessory drive gear support means, said block being stepped longitudinally adjacent said drive mounting portion so as to provide a limited space between said end plate and said block adjacent said portion and open on at least one side thereof,

a gear housing mounted on said end plate and defining therewith an enclosure for an engine timing and accessory drive gear train, said gear housing having an opening axially aligned with said end plate opening, said gear housing opening being adapted to permit installation of an optional accessory drive gear in said gear train without requiring removal of said gear housing,

a gear support member having a flange portion and a hub portion extending axially from said flange portion, said hub portion being adapted to receive such accessory drive gear for rotation thereon and including oil passage means extending to the surface of said hub portion to supply oil for lubricating such gear, said flange portion being received and piloted within said end plate opening to position said hub and such accessory drive gear with respect to said gear train, said support member further including a protruding pilot extending axially from said flange portion in the direction opposite said hub portion,

said pilot including an external annular pilot diameter and said oil passage means extending through said support member to the end of said pilot,

a support mounting plate disposed in the space between said engine block and said end plate, said mounting plate including a circular recess having an annular internal pilot diameter engaging and piloted on said support member pilot, said mounting plate including oil passage means extending from said recess to an outer edge of said plate and connecting with said support member oil passage means to provide for the supply of oil thereto from an external source,

first means securing said mounting plate to said end plate, and

second means securing said support member to said mounting plate,

said mounting plate being sufficiently thin to permit installation in or removal from its location between said block and end plate without removing said end plate from said block, said support member flange width being smaller than said gear housing opening so as to permit installation or removal of said support member through said gear housing opening without removal of said gear housing from said end plate.

3,888,227

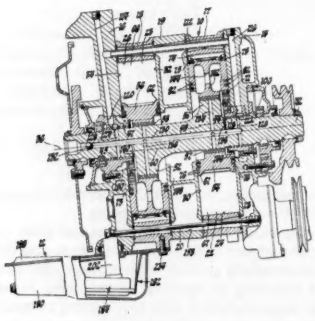
ENGINE OIL TANK

Raymond J. Green, Northville, and Paul D. Stevenson, Ann Arbor, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 15, 1974, Ser. No. 460,928

Int. Cl. F01m 1/10

U.S. Cl. 123—196 R **6 Claims**



1. An oil tank for an engine that is normally used in a substantially horizontal position and is transported in a substantially vertical position, means for detachably securing said oil tank to said engine in an underneath location, said oil tank having a top and a bottom and at one end extending underneath the engine and at the other end projecting outward of the engine with said one end located downward and said other end located upward and above the engine when the engine is in the transporting position, said top having a drain-vent hole adjacent said one end of said oil tank providing a drain-vent passage for receiving oil draining from a first hole in the engine and also venting said oil tank to the engine, seal means for sealing said oil tank to the engine to prevent leakage from said drain-vent passage, said top further having a suction-vent hole adjacent said one end of said oil tank for communicating said oil tank with a second hole in the engine, suction passage means extending through said suctionvent hole and the second hole in the engine and also extending in said oil tank along said bottom a predetermined distance toward said other end of said oil tank to an opening and then turning and extending back toward said one end of said oil tank to an opening at said bottom at a location intermediate said ends of said oil tank where oil remains available during shifting of the oil level in said oil tank during engine operation whereby oil can be suctioned from said oil tank through said suction passage means to lubricate the engine during engine operation but is prevented from draining through said suction passage means to the engine when the engine is in the transporting position, said suction passage means and said top around said suction-vent hole defining an annular vent passage for also venting said oil tank to the engine, seal means for sealing said oil tank to the engine to prevent leakage from said vent passage, anti-drainback passage means in said oil tank connected to said drain-vent passage and extending along said top a predetermined distance toward said other end of said oil tank to an opening whereby oil is allowed to drain along a vented passage from said engine into said oil tank during engine operation but is prevented from draining back into the engine when the engine is located in the transporting position, and additional anti-drainback passage means in said oil tank connected to said vent passage and extending with a downward slope along said top a predetermined distance toward said other end of said oil tank and then turning and extending still with a downward slope back toward said one end of said tank to an opening at a location intermediate said ends of said oil tank above the highest normal oil level in said oil tank that occurs with shifting of the oil level in said oil tank during engine operation whereby venting of said oil tank is provided through said vent passage but oil is prevented from entering said vent passage during shifting of the oil level in said oil tank during engine operation and in addition oil is prevented from draining through said vent passage to the engine when the engine is in the transporting position.

3,888,228

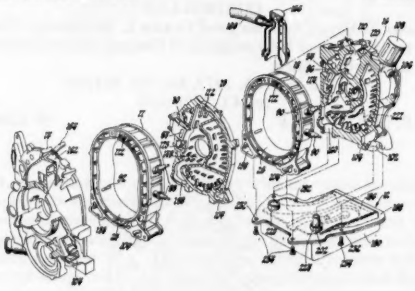
ENGINE OIL TANK

Erkki A. Koivunen, Livonia, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 15, 1974, Ser. No. 460,927

Int. Cl. F01m 1/10

U.S. Cl. 123—196 R **3 Claims**



1. An oil tank, an engine, means for detachably securing said oil tank to said engine in an underneath location, said oil tank having a top and a bottom and at one end extending underneath the engine and at the other end projecting outward of the engine, said top having a drain-vent hole adjacent said one end of said oil tank providing a drain-vent passage for receiving oil draining from a first hole in the engine and also venting said oil tank to the engine, seal means for sealing said oil tank to the engine to prevent leakage from said drain-vent passage, said top further having a suction-vent hole adjacent said one end of said oil tank for communicating said oil tank with a second hole in the engine, suction passage means extending through said suction-vent hole and the second hole in the engine and also extending in said oil tank along said bottom a predetermined distance to an opening at said bottom at a location intermediate said ends of said oil tank where oil

remains available during shifting of the oil level in said oil tank during engine operation whereby oil can be suctioned from said oil tank through said suction passage means to lubricate the engine during engine operation, said suction passage means and said top around said suction-vent hole defining an annular vent passage for also venting said oil tank to the engine, seal means for sealing said oil tank to the engine to prevent leakage from said vent passage, passage means in said oil tank connected to said drain-vent passage whereby oil is allowed to drain from said engine into said oil tank during engine operation, and additional passage means in said oil tank connected to said vent passage having an opening at a location intermediate said ends of said oil tank above the highest normal oil level in said oil tank that occurs with shifting of the oil level in said oil tank during engine operation whereby venting of said oil tank is provided through said vent passage but oil is prevented from entering said vent passage during shifting of the oil level in said oil tank during engine operation.

3,888,229

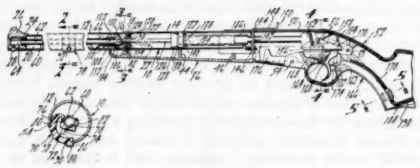
AIR GUN WITH ROTATABLE AMMUNITION LOADING DOOR

Earl L. Fischer, Bentonville, Ark., assignor to Victor Comptometer Corporation, Chicago, Ill.

Division of Ser. No. 54,354, July 13, 1970, Pat. No. 3,766,903. This application June 20, 1973, Ser. No. 371,731

Int. Cl. F41b *11/00*; **F41f** *1/04*; **F41c** *25/00*

U.S. Cl. 124—49 **5 Claims**



1. A gun for firing a projectile through a cylindrical bore in an elongated cylindrical barrel means comprising:

an elongated housing surrounding the cylindrical barrel means having a front end portion and a rear end portion and defined at least in part by a cylindrical wall having an inner cylindrical surface and defining a projectile storage chamber therebetween,

front end wall means mounted in said front end portion of said elongated housing providing a front end wall for said storage chamber,

rear end wall means mounted in said rear end portion of said elongated housing and providing a rear end wall for said storage chamber,

a projectile loading opening in said cylindrical wall intermediate said front end wall and said rear end wall of said elongated housing,

a loading door separate from said front and rear end wall means and axially spaced therefrom rotatably mounted within said housing circumjacent an intermediate portion of said barrel means between and in axially spaced relationship to said front end wall and said rear end wall,

means rotatably supporting said loading door relative to said housing and said barrel means, and

said loading door having an outer cylindrical surface rotatably slidably supported by said inner cylindrical surface of said housing and being slidably rotatable relative to said housing and relative to said barrel means between a closed position and an open position relative to said loading opening.

3,888,230

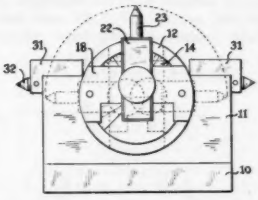
GRINDING WHEEL ANGLE DRESSER

Wayne O. Foshee, and Bruno J. Zapart, both of P.O. Box 1217, Hot Springs, Ark. 71901

Continuation-in-part of Ser. No. 342,821, March 14, 1973, abandoned. This application June 17, 1974, Ser. No. 479,700

Int. Cl. B24b *53/12*

U.S. Cl. 125—11 AT **6 Claims**



1. In a grinding wheel angle dressing tool having an upstanding wall plate, a ring bearing fixed in the wall plate, a rotatable carrier disk journaled in said ring bearing and locking means for selectively precluding rotatable movemtnt of said carrier disk, the improvement comprising

a cylinder block rigidly secured to the forward side of said disk and rotatable therewith,

said cylinder block extending transversely across said disk and a linear longitudinally extending slotted opening disposed along the underside of said cylinder block,

a reciprocally movable piston within said cylinder,

a U-shaped cutter holder movable with said piston, said cutter holder straddling said cylinder block from the forward side thereof,

the lower arm of said cutter holder being rigidly secured to the underside of said piston and extending forwardly in slidable engagement with the underside of said cylinder block and

the upper arm of said cutter holder extending rearwardly over and above the top of said cylinder block,

a manipulating handle projecting forwardly from the bight of said U-shaped cutter holder and

a grinding wheel cutter projecting outwardly from the upper arm of said cutter holder.

3,888,231

FIREPLACE FOR HEAT CONSERVATION AND DISTRIBUTION

Daniel T. Galluzzo, 3659 Fallston Rd., Jarrettsville, Md. 21084; Christopher G. Galluzzo, and Vincent Galluzzo, both of 1 Lakecliff Rd., Cockeysville, Md. 21030

Filed Mar. 4, 1974, Ser. No. 447,505

Int. Cl. F24b *7/00*

U.S. Cl. 126—120 **9 Claims**

1. A fire place assembly for installation in a communicating relation with an environmental space in a structure such as a dwelling or the like, comprising:

firebox means having heat exchange surfaces thereon and in which a fuel is oxidized to generate heat;

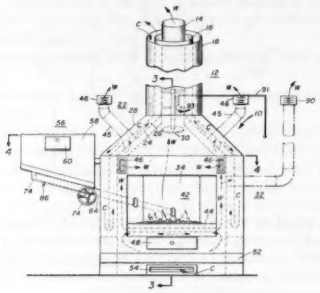
means enclosing the firebox means in spaced relation thereto and cooperating therewith to define an air circulation chamber substantially therebetween;

air intake means communicating the interior of the air circulation chamber with the aforesaid environmental space at a relatively low elevational level therein such that relatively cool air in said space is drawin into the air circulation chamber, the relatively cool air being heated therein on contact with the heat exchange surfaces on the firebox means, the air thus heated then being upwardly mobile to draw by way of a thermal suction effect additional relatively cool air into the air circulation chamber through the relatively low elevationally disposed air intake means;

air outlet means for distributing the heated air in the air circulation chamber to a desired point of use;

fuel hopper means disposed adjacent to said firebox means for introducing fuel contained in said hopper means into the firebox means, the fuel hopper means comprising

container means for holding the fuel, said container means having an opening in a lower portion thereof, and



chute means disposed to receive fuel thereinto from the opening in the container means, the chute means being extendible into the interior of the firebox means through an opening therein to dispense fuel thereinto; and,

means for extending the chute means into the firebox means, said last-mentioned means comprising

rack means on the chute means, and

pinion means engageable with the rack means and moveable to advance the chute means into the interior of the firebox means.

3,888,232

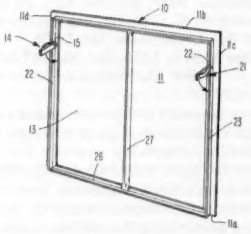
FIREPLACE SHUTOFF

Clarence A. Le Brun, 693 Hidden Valley Rd., King of Prussia, Pa. 19406

Continuation of Ser. No. 455,626, Feb. 25, 1974, abandoned. This application July 17, 1974, Ser. No. 489,136

Int. Cl. F24c *15/28*

U.S. Cl. 126—140 **8 Claims**



1. A fireplace shutoff device comprising:

a flat plate generally rectangular in shape and adapted to be moved toward and away from the opening of a fireplace whereby to cover and uncover the same;

at least one friction clip bracket disposed on the back side and adjacent one edge of said plate;

friction clip means displacably mounted on said clip bracket for movement between an operative position and an inoperative position, the clip means having mechanism providing for the same to be self-supporting in the operative position whereby to extend normal to the plate in position to engage the inside surface of the fireplace opening, the engagement providing for the clip means to be slidable over the surface to permit the plate to be moveable toward and away from the opening to cover and uncover the same and the engagement also providing for the clip means to exert sufficient pressure on the surface to hold the plate in position covering the opening and in the inoperative position the clip means being spaced away from the operative position so as to condition the device for storage and shipping purposes.

3,888,233

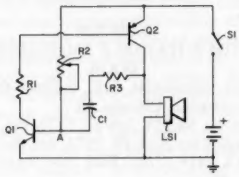
FIGURE WITH SIMULATED HEARTBEAT

H. Joe Ware, La Crescenta, Calif., assignor to Kamar Incorporated, Gardena, Calif.

Filed Jan. 17, 1974, Ser. No. 434,352

Int. Cl. A61b *19/00*

U.S. Cl. 128—1 C **5 Claims**



1. In a device having a body which simulates a living figure, the combination of means to emit an audible sound simulating a heartbeat in the figure, said means comprising an oscillator circuit whereby to produce electrical pulses of a predetermined duration and spacing and a speaker including a tranducer connected to produce audible sounds having a characteristic frequency and duration and a quality resembling heartbeats, said oscillator including a first transistor and a second transistor, resistors, a battery and switch means, circuit means including a capacitor and at least one of said resistors with a connection to the base of the first transistor for rendering said first transistor conductive upon charging of the capacitor, means whereby the conductance of the first transistor controls the conductance of the second transistor, circuit means between the second transistor and the said transducer to provide a first pulse to the transducer, and to oppositely charge the capacitor, and means to discharge said capacitor to render the first transducer non-conductive and to further discharge said capacitor to provide a further pulse in the transducer.

3,888,234

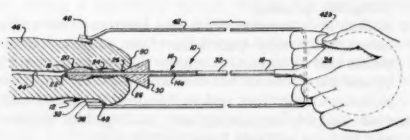
URETHROGRAM DEVICE

Samuel S. Clark, 592 Turner St., Glen Ellyn, Ill. 60137

Filed Sept. 11, 1972, Ser. No. 287,996

Int. Cl. A61b *5/02*

U.S. Cl. 128—2 R **2 Claims**



1. Apparatus for administering dye or the like to the urethra, comprising, in combination: an injection device which includes an elongate body having conduit means longitudinally therethrough and an outlet therein, said body having a distal end with said outlet disposed thereat and a proximal

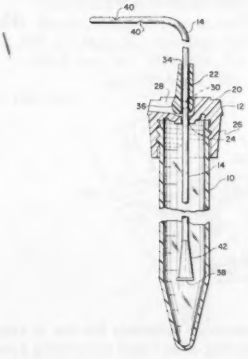
end, a first generally ovoid enlargement at said distal end and a second generally frusto-conical enlargement spaced slightly proximally from said first enlargement and defining therewith a reduced neck portion therebetween, a reservoir means at said proximal end of said body and spaced from said second enlargement by an elongate tubular portion which supports the reservoir means, said reservoir means being deformable for expelling a quantity of material therefrom and through the conduit means through said outlet, and clamp means including a clamp body portion of a size and shape for wrapping about the exterior of the penis and strap means extending outwardly from said clamp body portion for grasping during insertion of the distal end of said injection device into the penis for holding the injection device in place during the expulsion of dye into the urethra, said strap means being in the form of a strand extending generally transversely outwardly from said clamp body portion and terminating in a handle forming loop, said strand being of a length relative to said injection device so as to locate said loop adjacent said reservoir means when said clamp body portion is wrapped about the exterior of the penis and the distal end of said injection device is inserted into the urethra so that cooperative forces may be applied through said second enlargement and said clamp body portion in opposite directions facilitates maintaining said injection device in place during usage.

3,888,235

CATHETERIZATION KIT

Edwin A. May, Ridgewood, N.J.; Burton Salkin, Schaumburg, Ill., and Harold Paul McDonald, Jr., Memphis, Tenn., assignors to International Paper Company, New York, N.Y.

Filed Feb. 12, 1973, Ser. No. 331,595
Int. Cl. A61b *10/00;* **A61m** *25/00*
U.S. Cl. 128—2 F **13 Claims**



1. A catheterization kit for obtaining an uncontaminated sample of urine comprising:

a. a urine collection receptacle, said urine collection receptacle including a vessel having a top opening, and a rigid top member closing said top opening, said top member including liquid sealing means that engage said vessel about the periphery of said opening, and an aperture that extends through said top member, said aperture permitting flow of fluid into and out of said receptacle;

b. a catheter tube extending through said aperture of said top member, the distal end of said catheter including an opening for discharge of urine into said receptacle and terminating within said receptacle, said catheter tube slidably mounted in said aperture of said top member to permit removal of said catheter tube from said receptacle, the proximal end of said catheter terminating ouside said receptacle; and

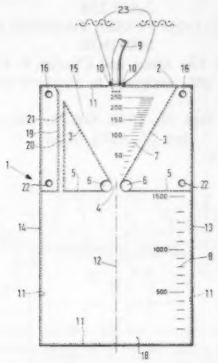
c. aperture sealing means mounted on said top member adjacent said aperture for closing said aperture after a sample of urine is obtained and after said catheter tube is removed from said receptacle.

3,888,236

APPARATUS FOR MEASURING A QUANITY OF URINE

Gunter Marx, Engadiner Str. 4, 8 Munich 71, Germany

Filed Mar. 28, 1973, Ser. No. 345,767
Claims priority, application Germany, Mar. 28, 1972, 7211842[U]
Int. Cl. A61b *5/10;* **A61f** *5/44*
U.S. Cl. 128—2 F **13 Claims**



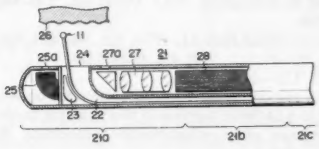
1. A urine measuring and collecting container comprising two flat plastic sheets joined together by first weld seams to form said container, said container being divided into an upper measuring chamber and a lower collecting chamber by second weld seams joining said sheets together, said measuring chamber having the shape of an inverted cone defined by said second weld seams with the base positioned at the top of said container and the apex positioned above said collecting chamber, said measuring chamber having an opening in said base for receiving urine, said measuring chamber having indicia associated therewith for measuring the quantity of urine receive therein in a unit of time, the apex of said cone forming an outlet for transferring urine from said measuring chamber to said collecting chamber, and means associated with said outlet for enabling said outlet to be selectively closed.

3,888,237

PH-MEASURING DEVICE USED IN AN ENDOSCOPE

Toshiyuki Mori, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Oct. 15, 1973, Ser. No. 406,292
Int. Cl. A61b *5/05*
U.S. Cl. 128—2 E **6 Claims**



1. In an endoscope provided with an elongated forceps channel **(22)**, a PH-measuring device **(10)** comprising:

an elongated flexible tubular member **(16)** including an elongated flexible tube **(18)** and an elongated flexible tubular metal coil **(17)** extending along and in the flexible tube **(18)**, said tubular member **(16)** being inserted into

the elongated forceps channel (22) and extendable at one end into a body cavity;

a glass electrode (11) coupled to said one end of the elongated tubular metal coil (17) so as to be extendable into a body cavity and adapted to contact with matter in said body to indicate a potential corresponding to the PH of said body matter which is to be examined; and

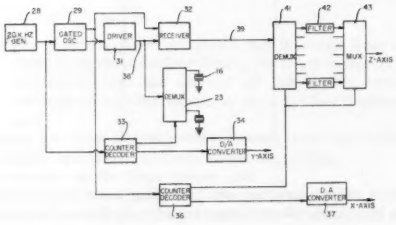
an elongated electrical lead (20) passing through said elongated tubular metal coil (17) and connected at one end to the glass electrode (11) and at the other end adapted to be connected to an external potential measuring device through the flexible tubular member (16).

3,888,238

ULTRASONIC BLOOD VESSEL IMAGING SYSTEM AND METHOD

James D. Meindl, Los Altos, and Charles F. Hottinger, Stanford, both of Calif., assignors to Stanford University, Stanford, Calif.

Filed Sept. 28, 1973, Ser. No. 401,649
Int. Cl. A61b *10/00*
U.S. Cl. 128—2 V **8 Claims**



1. A system for imaging blood vessels by detecting the flow of blood particles through the vessels including a transducer comprising an array of transducer elements, means for periodically and sequentially driving each of said transducer elements with a pulse of energy having a predetermined frequency, a Doppler receiver means sequentially connected to each of said respective transducer elements and providing a video signal indicating the flow of blood particles in the vessels, means for periodically sampling the video signal from the Doppler receiver means and for generating an output indicating reflection from a moving blood particle located at a corresponding distance away from the respective transducer element, and means for forming a display indicating the location under each element of the array where moving blood particles have been detected to thereby form a display of the depth, location and size of the underlying vessel.

3,888,239

FLUID INJECTION SYSTEM

Morton K. Rubinstein, 3155 Antelo Rd., Los Angeles, Calif. 90024

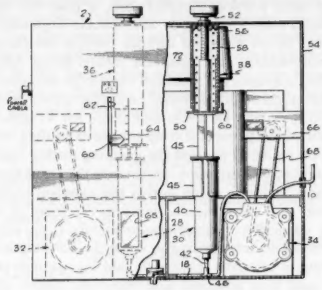
Filed June 21, 1974, Ser. No. 481,501
Int. Cl. A61b *6/00*
U.S. Cl. 128—2 A **21 Claims**

1. An angio-graphic injection system for continuously providing to a catheter supplies of two separate fluids used in the performance of a catheterization procedure, the injection system comprising:

a pair of reservoir means for containing a ready supply of said two fluids, respectively;

a pair of pressurizing means each connected to one of said pair of reservoir means for maintaining said fluids contained therein under a predetermined pressure;

a pair of pumping means respectively connected to one of said reservoir means for pumping fluid into said reservoir means from a source thereof to continuously maintain said reservoir means in a filled condition;



and fluid conduit means for interconnecting said respective reservoir means and pump means, said fluid conduit means provided with means for being connected to a catheter to supply said fluids thereto.

3,888,240

ELECTRODE ASSEMBLY AND METHODS OF USING THE SAME IN THE RESPIRATORY AND/OR CARDIAC MONITORING OF AN INFANT

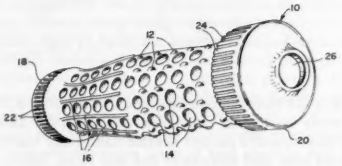
Herbert E. Reinhold, Jr., and Richard B. Toren, both of Rockville, Md., assignors to Survival Technology, Inc., Bethesda, Md.

Continuation-in-part of Ser. No. 440,750, Feb. 8, 1974, abandoned. This application May 8, 1974, Ser. No. 468,137
Int. Cl. A61b *5/04*
U.S. Cl. 128—2.06 E **13 Claims**

1. A disposable electrode assembly for use in respiratory and/or cardiac monitoring of an infant comprising a sheet-like pad of soft pliable non-conductive material having an infant back receiving area of approximately 4½ inches by 4½ inches, a plurality of separate flexible sheet form electrodes extending substantially throughout the back receiving area of said pad so as to be intimately contacted by the skin of an infant's back received on said back receiving pad area, said pad having portions converging outwardly from opposite sides of said back receiving area for extending generally beneath the armpits and along the lower edge of the rib cage of an infant when said converging side portions are held to the sides of the infant's torso, strap means of soft pliable material for extending across the chest cage of the infant centrally between said converging side portions, means for releasably adjustably securing said strap means in the aforesaid extending relation to thereby hold said converging side portions against the sides of the infant's torso so that said flexible sheet-form electrodes are maintained in skin contact with the infant's back without relative surface-to-surface movement therebetween when the infant moves to either side from a normal back supported

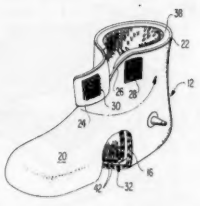
position or is moved into a front supported position, and terminal means for effecting a detachable electrical connection of said electrodes with the leads of a monitoring instrument.

3,888,241
MASSAGE DEVICE
William L. Fischer, 3196 Carry Ave., P.O. Box 2336, East Liverpool, Ohio 43920
Filed Apr. 1, 1974, Ser. No. 456,528
Int. Cl. A61h *29/00*
U.S. Cl. 128—24.3 **6 Claims**



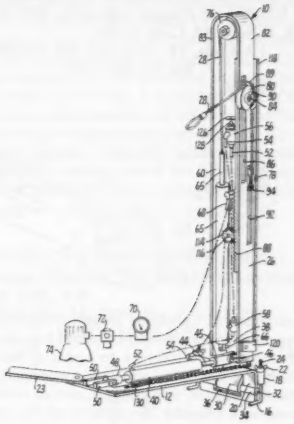
1. A hollow cylindrical shaped massage device with skull-cap shaped recesses on the surface of the cylinder, the improvement comprising a plurality of raised dimples which are separated from the skull-cap recesses and are raised above the surface from which the skull-cap recesses are recessed.

3,888,242
COMPRESSION MASSAGE BOOT
Stephen W. Harris, Box 147, Ranchester, 82839, and Clyde A. Praye, 305 1/2 State St., Rawlings, both of Wyo. 82301
Filed Aug. 23, 1974, Ser. No. 500,120
Int. Cl. A61h *7/00*
U.S. Cl. 128—64 **6 Claims**



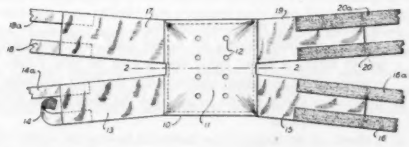
1. A compression massage boot for application to a human appendage, the boot comprising:
an outer shell formed of semi-rigid material and having a main chamber section and a sleeve section;
the sleeve section having an overlap portion with adjustable fastener means thereon whereby the sleeve section is adjustable in diameter;
the outer shell having an inner surface and an outer surface;
a flexible gland conformably fitted within the outer shell, the gland having an inner panel and an outer panel, said inner and outer panels being joined by edge connecting portions;
the inner panel including an inside surface; and
a plurality of stub tips formed of flexible material projecting inwardly on the inside surface of the inner panel to contact the appendage.

3,888,243
ADJUSTABLE TRACTION DEVICE
Roy Y. Powlan, No. 1 - Chapel Dr., Lafayette, Calif. 94549
Filed July 18, 1974, Ser. No. 489,617
Int. Cl. A61h *1/02*
U.S. Cl. 128—75 **11 Claims**



1. An adjustable traction device comprising:
a. a base portion adapted to be mounted to a hospital bed,
b. an upright support extending above the level of the bed and swingably secured to the base portion whereby said support may be moved away from a patient in the bed,
c. flexible cable means secured to said support for attachment to a patient in the bed, the vertical position of the point of attachment for said cable means being vertically adjustable relative to said support, and
d. means for applying a force to said flexible cable means to place the patient in traction wherein said force applying means comprise pressure fluid means including a cylinder and piston for the cylinder, said piston being secured to said flexible cable and said cylinder being secured to said base portion.

3,888,244
MEANS FOR SUPPORTING A LIMB IN RELAXED POSITION
Steve Lebold, 45 Church St., Montclair, N.J. 07042
Filed Feb. 1, 1974, Ser. No. 438,632
Int. Cl. A61f *5/10*
U.S. Cl. 128—77 **5 Claims**



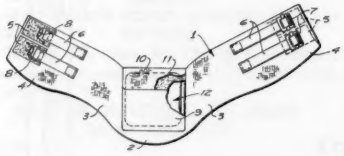
1. Means for supporting a limb in a relaxed angular position which comprises a resilient contoured pad having a semirigid backing adapted to engage the inside surfaces of the joint between upper and members of the limb, said pad and said backing being bent at an angle of at least 15° and a pair of cooperating strap members affixed to said pad and adapted to lie above and below said joint and adapted to surround said upper and lower members with sufficient tension to exert leverage upon said members and said joint to retain said members in angular position with respect to each other, said pad

and said strap members cooperating to restrain said limb from being extended and maintained in an angular position.

3,888,245
WEIGHTED SURGICAL BELT

E. Boyd Berntson, 5101 Marsha St., Apt.135, Bakersfield, Calif. 93309, and Douglas Lemmons, 4201 Columbus St., Apt. B, Bakersfield, Calif. 93306

Filed Nov. 19, 1973, Ser. No. 416,890
Int. Cl. A61f *5/02*
U.S. Cl. 128—78 **6 Claims**



1. A surgical force applying means, comprising:
a. a weight member adapted to extend laterally of the sacral and coccygeal vertebraes to apply a distributed load, including a first side conforming essentially to the body surface, relatively thin margins, and an outwardly arched second side whereby the contour of the weight member blends with the body curvature; and
b. means adapted to extend over the lower back in confronting relation to the sacral and coccygeal vertebraes for fixing the weight member in position to exert a downwardly and anteriorly directed force on the sacral and coccygeal vertebraes.

3,888,246
ANTI-FOG SURGICAL FACE MASK

William Lauer, Madison, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

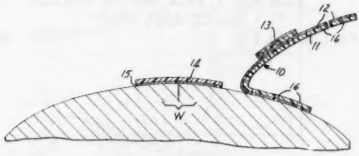
Filed Nov. 1, 1973, Ser. No. 411,873
Int. Cl. A61f *9/04*
U.S. Cl. 128—146.2 **16 Claims**

1. A surgical face mask comprising:
a. a body portion having an upper part, a lower part, an upper edge, a lower edge and a pair of side edges and comprising a filtration medium for filtering bacteria;
b. means for securing the mask over the mouth and nose of the wearer; and
c. a sheet of air impervious material having an upper edge, a lower edge, and a pair of side edges, the upper edge of said air impervious material being secured to the upper part of said body portion, the lower edge of said air impervious material lying between said upper and lower edges of said body portion and being substantially free from attachment to said body portion, said sheet of air impervious material extending substantially from side to side of said body portion whereby, when the mask is worn, exhaled breath is directed downwardly from the upper part of the mask and away from the eyes of the wearer.

3,888,247
FIRST AID BANDAGE

Carl B. Stenvall, Portchester, N.Y., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 10, 1973, Ser. No. 404,890
Int. Cl. A61l *15/01*; **A61f** *13/00*
U.S. Cl. 128—155 **7 Claims**

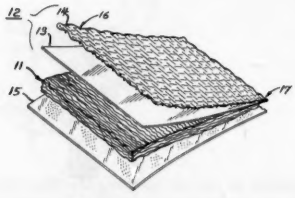


1. A first aid bandage comprising a first flexible adhesively coated sheet having an absorbent pad centrally adhesively secured thereto and a second flexible adhesively coated sheet superposed over said absorbent pad and being lightly releasably adhered to the adhesive of said first sheet, the adhesively coated surface of said second sheet being disposed in the same direction as the adhesively coated surface of said first sheet such that the entire surface of the first aid bandage is adhered to a wound in use.

3,888,248
ABDOMINAL PAD OR SURGICAL DRESSING

Francis C. Moore, and Leon R. Perkinson, both of Indianapolis, Ind., assignors to Moore-Perk Corporation, Indianapolis, Ind.

Filed July 23, 1973, Ser. No. 381,734
Int. Cl. A61f *13/00*
U.S. Cl. 128—156 **9 Claims**

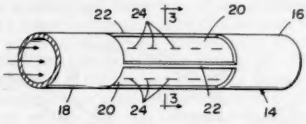


8. An abdominal pad or covering comprising a layer of highly absorbent core material having a thickness in the range one-fourth in. to three-eighths in.; an application covering comprising a thin layer of thermoplastic material having a thickness of about 0.2 inch and a layer of spun-bonded nylon exterior of said layer of thermoplastic sheet material, said application covering a width greater than the corresponding width of said core material; and a moisture-resistant barrier on the side of said central core material opposite said application covering and comprising a second layer of air-pervious, liquid impervious material adjacent the core material; said moisture-resistant covering also having a width greater than the corresponding width of said core material and being secured to said application covering under the application of heat and pressure about opposite peripheral edges about said core material, said spun-bonded nylon being bonded to said core material substantially throughout their opposing surfaces by said layer of thermoplastic material, and said moisture barrier being attached to said application covering.

3,888,249
ARTERIAL INFUSION CATHETER

David L. Spencer, 1243 N. State St., Chicago, Ill. 60606

Filed Nov. 2, 1973, Ser. No. 412,199
Int. Cl. A61m *05/00, 25/00*
U.S. Cl. 128—214 R 2 Claims

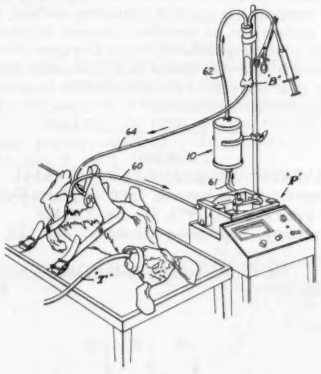


1. A catheter for use in arterial infusion of fluids and the like, said catheter comprising a cannula formed of a material sufficiently rigid to facilitate insertion thereof into an artery, said cannula having a distal end and a proximal end, a part of said cannula at the distal end having a plurality of cutout portions spaced around the circumference of said cannula and separating said distal end from the main body of the cannula, said cutout portions being separated by ribs extending longitudinally between the main body of said cannula and its distal end which ribs are formed integrally with said cannula, a flexible material extending completely over each of said cutout portions along the inside surface of said cannula and having a modulus of elasticity less than the modulus of elasticity for the material which forms said cannula, the flexible material covering each of said cutout portions having a plurality of slits therein to provide for discharge of fluid from inside of said cannula through said slits when the fluid pressure in said cannula exceeds the pressure on the outside of said cannula which preventing the retrograde flow of fluid into said cannula regardless of the pressure difference between the inside and outside of said cannula.

3,888,250
DISPOSABLE HEMOPERFUSION ASSEMBLY FOR DETOXIFICATION OF BLOOD AND METHOD THEREFOR

John B. Hill, Chapel Hill, N.C., assignor to Becton, Dickinson and Company, East Rutherford, N.J.

Filed July 2, 1973, Ser. No. 375,835
Int. Cl. A61m *5/00, 1/03*
U.S. Cl. 128—214 R 15 Claims



1. A hemoperfusion apparatus useful in the detoxification of blood comprising:

a. a housing having spaced outlet and inlet openings, blood transfering means connected thereto adapted to be connected to a source of blood to be detoxified and having an interior passageway for the blood extending between the inlet and outlet openings; and,

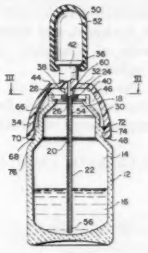
b. a detoxification cartridge assembly disposed in the passageway in the housing, said cartridge assembly including a base supporting sheet having a coating of adhesive on at least one side thereof and a uni-layer of individually spaced apart particles of adsorbent material between 100 and 5,000 microns in size bonded by the adhesive to the coated side of the sheet so that the major portion of the particles are free from bonding material whereby to prevent fragmentation of the adsorbent material said sheet being formed to provide a cartridge having alternate layers of base sheet material and adsorbent particles, said particles being in intimate contact with said layers;

c. said sheet material, adhesive, adsorbent particles and portions of the housing which the blood engages being inert to each other and being nontoxic and inert to blood.

3,888,251
OPTHALMIC DISPENSING DEVICE

Kenneth Harrison, Matawan, N.J., assignor to Lawrence Peska Assoc., New York, N.Y.

Filed May 13, 1974, Ser. No. 469,288
Int. Cl. A61m *1/00*
U.S. Cl. 128—233 15 Claims



1. An opthaimic dispensing device, comprising: (a) a receptacle member comprising a chamber for holding a fluid to be dispensed and comprising a mouth portion, (b) an insert member adapted to be mounted at said mouth portion, said insert member comprising a first tubular element extending from said mouth portion into said chamber, a socket element disposed at a first end of said tubular element located at said mouth portion, and an apertured plate member disposed at said first end and extending across the mouth of said receptacle member, (c) an eye cup element comprising a base portion and a wall portion and further comprising a second tubular element located at said base portion, said second tubular element comprising a first tubular projection extending from the interior face of said cup element only into the area defined by said base and wall portions and a second tubular projection extending from the exterior surface of said cup element, said first tubular projection being adapted to engage said socket element in substantially air tight relationship, and (d) a deformable bulb member disposed at said second tubular projection.

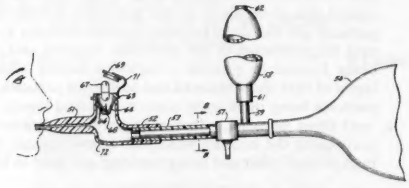
3,888,252
POWDER INHALER

Anthony J. Side, Goring-on-Thames, Oxfordshire, England, and Bernard McDonald, 18212 Pacific Coast Hwy., Malibu, Calif. 90265

Filed Jan. 23, 1974, Ser. No. 435,937
Int. Cl. A61m *15/06*
U.S. Cl. 128—266 10 Claims

1. A medicinal powder dispensing device for supplying powder to an air stream to be inhaled comprising:

a mouthpiece having an air flow passage therethrough;
a means for providing an air stream including an inflatable normally flaccid elastic balloon;
means connected to the balloon for manually inflating the balloon;
means for temporarily closing the balloon in an inflated state;



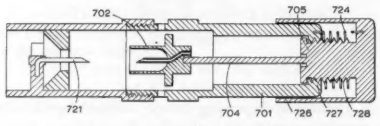
disconnectable air passage means interconnecting the balloon and mouthpiece for controlling the passage of air from the balloon to the mouthpiece; and
means for introducing powder into the air stream between the balloon and the mouthpiece.

3,888,253

DEVICE FOR ADMINISTRATION OF MEDICINES

Peter Ridgway Watt, Ewhurst, and Harold George Wilkinson, Goring-by-Sea, both of England, assignors to Beecham Group Limited, England

Continuation of Ser. No. 382,214, July 24, 1973, abandoned. This application June 7, 1974, Ser. No. 477,487
Claims priority, application United Kingdom, Aug. 4, 1972, 36428/72
Int. Cl. A61m *15/00, 15/06*
U.S. Cl. 128—266 **24 Claims**



1. A device for the oral administration of finely divided solid medicaments which device comprises a hollow housing, an elongate semi-flexible vibratable member which is fixed adjacent one end thereof within the housing and free at the other end, a capsule holder attached to said end of the vibratable member at a point remote from its fixed end; said housing having inlet and outlet vents permitting air to flow through the housing, the outlet vent being adapted for application to or insertion into the mouth; and means for causing said member to vibrate comprising directed air flow means reacting with said flexible vibrating member.

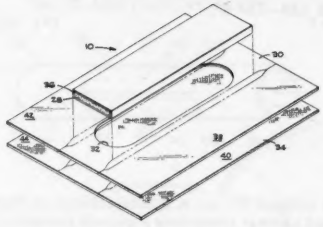
3,888,254

SANITARY NAPKIN

Laurel A. Hendricks, P.O. Box 943, Palo Alto, Calif. 94302

Filed Feb. 11, 1974, Ser. No. 441,047
Int. Cl. A61f *13/16*
U.S. Cl. 128—290 R **9 Claims**

1. A sanitary napkin comprising:
a. an absorbent pad having a body-facing side and a garment-facing side;
b. a layer of liquid repellent material having an opening therein and being disposed about said pad with said opening positioned confronting the body-facing side of said pad and with opposite end portions thereof overlapping one another over the garment-facing side of said pad; and
c. a layer of absorbent material disposed around said pad with said layer of liquid repellent material disposed between said pad and said layer of absorbent material, said layer of absorbent material being approximately coextensive with said layer of liquid repellent material and opposite end portions of said layer of absorbent material and



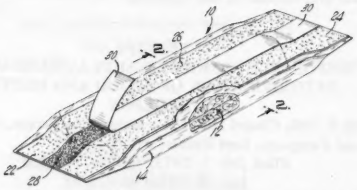
said layer of liquid repellent material overlapping one another and being coextensive with the garment-facing side of said pad, said overlapping end portions of said layer of absorbent material and said layer of liquid repellent material being secured together.

3,888,255

SANITARY NAPKIN HAVING IMPROVED ATTACHMENT SYSTEM

Praful H. Shah, Kendall Park, and Subramania Srinivasan, East Brunswick, both of N.J., assignors to Personal Products Company, Milltown, N.J.

Filed Oct. 4, 1974, Ser. No. 511,979
Int. Cl. A61f *13/16*
U.S. Cl. 128—290 R **9 Claims**



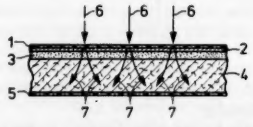
1. A sanitary napkin to be adhered to the crotch portion of a garment comprising a garment contacting surface, a body contacting surface and an absorbent element therebetween, said garment contacting surface having a first layer of material therein having a high co-efficient of friction, said first layer having over at least a portion thereof a second layer comprising a pressure sensitive adhesive.

3,888,256

LAYERED ABSORBANT PAD MATERIAL

Hans Studinger, 6 Johannisstrasse, 8500 Nurnberg, Germany

Filed Feb. 13, 1973, Ser. No. 332,229
Claims priority, application Germany, Feb. 22, 1972, 2208126
Int. Cl. B32b *5/16;* **A61f** *13/16*
U.S. Cl. 128—296 **1 Claim**



1. A layered absorbent hygienic pad of joined-together layers comprising:

an uppermost surface layer of plastics-bound fiber fleece, a next-adjacent carrier filter sheet of cellucotton, a next-adjacent layer of granulated particulate swelling substance formed from the group consisting of polyacrylamide or sulphonated polystyrene with spacings between adjacent particles,

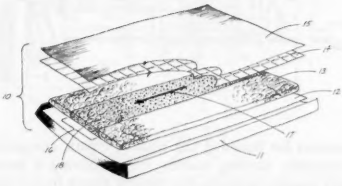
an absorbent layer consisting of one or more laps of cellulose wadding and being free of any swelling substance, and a lowermost surface layer of a material formed from the group consisting of a plastics-bound fiber fleece or a liquidimpervious foil with the distribution of the particles of the layer of the swelling substance being such that the spacing between adjacent particles is no greater than half of the particle diameter increase realized upon particle swelling.

3,888,257

DISPOSABLE ABSORBENT ARTICLES

Roy G. Cook, and James P. Jackson, both of Greenwood, S.C., assignors to Parke, Davis & Company, Detroit, Mich.

Filed Oct. 1, 1973, Ser. No. 402,326
Int. Cl. B32b *5/16;* **A61f** *13/18;* **A47c** *21/06*
U.S. Cl. 128—296 **6 Claims**



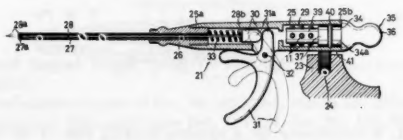
1. A disposable machine-produced article for absorbing body fluid waste comprising an absorbent three-dimensional matrix of fiberized wood pulp in layered relation with a carrier sheet, the matrix having a rectilinear central zone of uniform width in the machine direction and, located within voids of the central zone, a three-dimensional dispersion of particles of water insoluble hydrocolloid polymer, the amount by weight of wood pulp fiber in the central zone for each part by weight of polymer particles being in the approximate range from 1 to 11.5, the water absorbing capacity of the polymer particles being on a weight basis at least 50 parts of water per part of polymer particles.

3,888,258

DRAIN FOR THE EARDRUM AND APPARATUS FOR INTRODUCING THE SAME

Taichiro Akiyama, 19-23 Shimoochia, 2-chome, Tokyo, Japan

Filed Oct. 29, 1973, Ser. No. 410,688
Claims priority, application Japan, Nov. 7, 1972, 47-111376; Nov. 7, 1972, 47-128293
Int. Cl. A61b *17/32, 17/43*
U.S. Cl. 128—305 **6 Claims**



1. Apparatus for inserting a hollow drain in the eardrum comprising:

a body;

a tube extending axially of said body from one end thereof;

a needle received within said tube and movable between a retracted position and an extended position in which its tip projects from the end of said tube remote from said body;

a contact element positioned within said body and mounted on the rear end of said needle opposite said tip;

a spring within said body urging said needle into said retracted position; and,

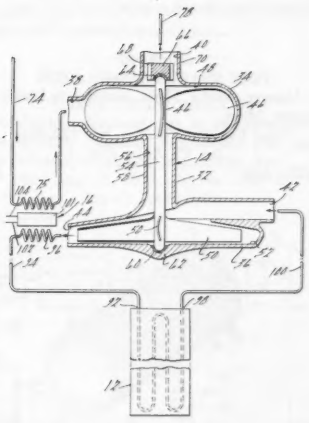
a pressing means mounted in said body for pressing on said contact element for moving said needle from said retracted position to said extended position, the outside diameter of said needle being substantially equal to the inside diameter of said drain whereby said needle is adapted to be received within the drain for positioning of the drain adjacent said tip, and the outside diameter of said tube being larger than the inside diameter of said drain whereby said remote end of said tube is adapted to bear against one end of said drain, said apparatus being thereby adapted to be moved into position adjacent the eardrum, said needle being adapted to be extended for forming a hole in the eardrum, and said tube being adapted to be thereafter forced against said drain for forcing the drain into said hole to thereby position the drain relative to the eardrum.

3,888,259

HYPOTHERMIA SYSTEM

Robert C. Miley, 2712 Roseland Ave., East Lansing, Mich. 48823

Filed Aug. 21, 1973, Ser. No. 390,271
Int. Cl. A61f *7/00*
U.S. Cl. 128—400 **14 Claims**



1. In a hypothermia system, the combination including hypothermia pad means, fluid heat exchange means, fluid pressure operated impeller-pump means having an impeller portion and a pump portion each provided with a fluid inlet and a fluid outlet, a source of fluid pressure, means for connecting the inlet of said impeller portion to said source of fluid pressure, and a closed fluid circuit connecting the outlet of said pump portion to the inlet of said pump portion through said heat exchange means and said hypothermia pad means, said source of fluid pressure comprising a second closed fluid circuit including the outlet of said impeller portion and second heat exchange means.

3,888,260
RECHARGEABLE DEMAND INHIBITED CARDIAC PACER AND TISSUE STIMULATOR

Robert E. Fischell, Silver Spring, Md., assignor to The John Hopkins University, Baltimore, Md.

Continuation-in-part of Ser. No. 267,114, June 28, 1972, abandoned. This application Apr. 26, 1974, Ser. No. 464,441
Int. Cl. A61n *1/36*
U.S. Cl. 128—419 PG **29 Claims**

23. In a demand inhibited cardiac pacer including a first electronic circuit means for generating output heart stimulating pulses for application to a patient's heart and a second electronic circuit means for monitoring the patient's heart beat and inhibiting the generation by said first electronic circuit means of said heart stimulating pulses in the presence of an acceptable natural heart beat rate, the improvement comprising,

a step-up transformer included in said first electronic pulse generating circuit means and having primary and secondary windings for increasing the amplitude of each heart stimulating pulse prior to application thereof to the patient's heart,

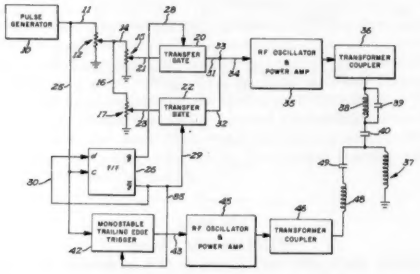
catheter means having one end connected electrically to said second electronic circuit means and connectable electrically to the secondary winding of the step-up transformer of said first electronic pulse generating circuit means and terminating at its opposite end in electrode means adapted to be disposed at a preselected location in the patient's heart for applying the heart stimulating pulses generated by said first electronic circuit means and for sensing the electrical R-wave signal emanating from the patient's heart when the heart beats, and

switching means for selectively connecting the secondary winding of the step-up transformer of said electronic pulse generating circuit means to said catheter means only when an output pulse is being generated by said pulse generating circuit means.

3,888,261
TIME SHARED STIMULATOR

Donald D. Maurer, Anoka, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.

Filed Dec. 7, 1973, Ser. No. 422,896
Int. Cl. A61n *1/36*
U.S. Cl. 128—420 **22 Claims**



11. A time shared stimulator which comprises:

pulse generator means;

first means connected to receive the pulses from said pulse generator means for controlling the power level of said pulses;

second means connected to receive the pulses from said pulse generator for controlling the power level of said pulses independently of said first means;

means operatively connected to said first and second means for producing a train of pulses in which pulses from said first means alternate with pulses from said second means;

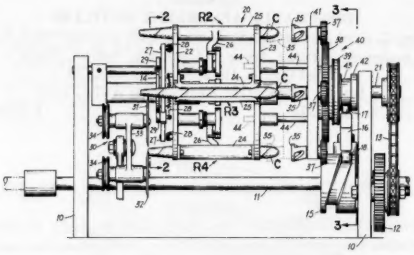
first and second output means adapted for connection to a living animal body; and

means connected between said pulse train producing means and said output means for alternately routing pulses in said pulse train between said first and second output means.

3,888,262
METHOD AND APPARATUS FOR FINISHING THE ENDS OF CIGARS

Frank Hollenton, and William P. Park, both of Richmond, Va., assignors to AMF Incorporated, White Plains, N.Y.

Filed Feb. 11, 1974, Ser. No. 441,689
Int. Cl. A24c *1/32*
U.S. Cl. 131—29 **13 Claims**



4. Apparatus for finishing the ends of cigars, comprising

a continuously moving carrier means having a series of equally spaced receivers for moving cigars from a feed-in means to a feed-out means,

control means causing each receiver to receive a cigar to be finished as it passes the feed-in means and to release a finished cigar as it passes the feed-out means,

knurling means spaced from one side of and moving in unison with said carrier means,

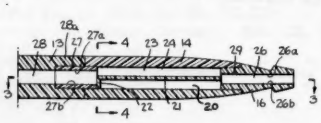
cam means cyclically moving said knurling means into and out of engagement with the head ends of the moving cigars to knurl a plurality of times and finish such cigar ends, and

cutting means disposed adjacent to the other side of said carrier means opposite from said knurling means for the end to be lighted of each cigar moving thereby approaching the feed-out means.

3,888,263
MOISTURE FREE PIPE STEM MOUTHPIECE

Gordon W. Blanchard, Toms River, N.J., assignor to Gordon W. Blanchard, Toms River, N.J.

Filed June 8, 1973, Ser. No. 368,227
Int. Cl. A24f *01/06*
U.S. Cl. 131—201 **5 Claims**



1. A mouthpiece for a tobacco smoking pipe or the like adapted to be used in a generally horizontal position and comprising a generally tubular stem portion having a bit end from which the smoke is drawn, and an opposite end, said tubular stem portion defining a longitudinal passage for smoke from said opposite end to said bit end thereof, a partition arranged longitudinally in said passage and spanning there-

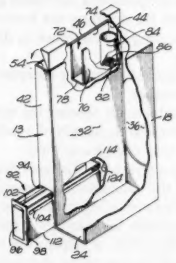
across to divide said passage substantially into upper and lower halves, said partition being generally horizontally oriented in normal use of the mouthpiece, a wall extending downwardly from said partition and into circumscribing contact with that portion of the wall of said passage which is below said partition to close said lower half of said passage thereat and form a pocket beneath said partition, said pocket having an opening at the downstream end thereof, the upper half of said passage being substantially straight and unobstructed between said bit end and said opposite end of said stem portion, and means providing longitudinal grooves within said tubular stem portion adapted to receive opposite edge portions of said partition.

3,888,264

COMBINED CIGARETTE PACKAGE HOLDER AND ASHTRAY COMPARTMENT

Paul S. Baclit, 2167 College View Dr., Monterey Park, Calif. 91754

Filed Oct. 10, 1973, Ser. No. 405,193
Int. Cl. A24f *15/10, 19/14*
U.S. Cl. 131—235 R **5 Claims**



1. A combined cigarette package holder and ashtray compartment comprising:

a cigarette package holder defining a first elongate container whose dimensions are sufficient for placing a package of cigarettes therein, said container being defined by a first side wall and a second side wall spaced from one side of said first side wall to approximate the width of a package of cigarettes, an end wall, a top wall and a bottom wall;

an ashtray compartment of similar height and width dimensions as said cigarette package holder and defined as shallower than said package holder by a side wall spaced from the other side of said first side wall, a top wall, a bottom wall and first and second spaced end walls the top wall of said ashtray compartment including a lockable lid which can be adjusted for placing ashes therein and a shelf in said ashtray compartment adjacent said movable lid and spaced downwardly therefrom, screen material therein defining openings therethrough and a tubular depository carried on said shelf around said screen material, for enabling lit cigarettes to be extinguished.

3,888,265

PIPE HOLDER

Robert Eugene Yount, 11168 W. 70th Ter., Shawnee Kans. 66203

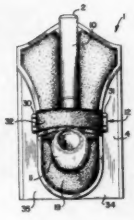
Continuation-in-part of Ser. No. 454,264, March 25, 1974, abandoned. This application Oct. 7, 1974, Ser. No. 512,738
Int. Cl. A24f *09/14*
U.S. Cl. 131—260 **12 Claims**

8. A pipe support structure comprising:

a. a backplate member having opposite ends and opposite sides;

b. a pipe cushioning member mounted on one side of said backplate member and having portions defining an elongated recess therein and extending longitudinally from one end of said backplate member and adapted to receive a lower portion of a stem and bowl of a pipe;

c. retaining means mounted on said backplate member and extending transversely of the pipe cushioning member and adapted to resiliently engage an upper portion of the stem of said pipe to thereby retain same in the elongated recess in said pipe cushioning member, said retaining means having end portions positioned at respective opposite edges of said backplate member and adapted to have



a center portion thereof move away from said cushioning member in response to opposed forces applied to said end portions; and

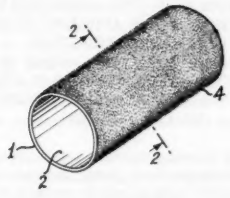
d. a support member having one end thereof hingedly mounted on the other side of said backplate member adjacent one end thereof and having the other end of said support member selectively movable to a position spaced from the other end of said backplate member when said other ends are in engagement with a supporting surface to position said backplate member and support member in a generally upstanding position.

3,888,266

HAIR CURLING ROLLER

Weldon K. Weldon, deceased, late of Jacksonville, Fla., and Hazel W. Weldon, executrix, Jacksonville, Fla., assignors to Hazel W. Weldon, executrix, Jacksonville, Fla.

Filed Aug. 11, 1971, Ser. No. 170,746
Int. Cl. A45d *2/00*
U.S. Cl. 132—39 **4 Claims**



1. An elongated hair curling roller including a body having a myriad of short, straight filaments of synthetic plastic material adhered to the outer surface of said body, at least most of said filaments being oriented to have their inner ends connected to said surface of said body and to extend in a direction generally normal to said surface and outwardly therefrom and having free outer ends, said filaments being of between about **4** and **20** denier, having lengths of between about **0.04** and **0.1** inches and being arranged in a concentration in the order of tens of thousands of said short filaments per square inch of said surface.

3,888,267

APPARATUS AND METHOD FOR TEMPORARILY STORING SHEETS OF PAPER

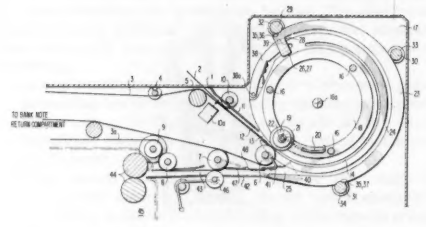
Kurt Gautschi, Onex, Switzerland, assignor to Sodeco-Saia AG., Geneva, Switzerland

Filed May 24, 1974, Ser. No. 473,294

Claims priority, application Switzerland, May 24, 1973, 7437/73

Int. Cl. B65h 29/58

U.S. Cl. 133—3 R 20 Claims



6. A paper currency handling apparatus for use with the vending of products or services having substantial value requiring payment with a plurality of paper sheets comprising: means responsive to the introduction of sheets of paper currency one at a time, for transporting each sheet into an inner slot of a rotatable sheet storage device while said device is stationary;

means for rotating said storage device one revolution in a first direction after each sheet is introduced into said inner slot to transfer said sheet to an outer slot; and

means for rotating said storage device one revolution in the opposite direction for removing simultaneously a group of sheets from said outer slot to a sheet deflector for optionally directing said group of sheets to either of two sheet transfer paths, one of said paths leading to the outside of said apparatus for return of said sheets of currency and the other of said paths transporting said sheets of currency to a repository.

3,888,268

METHOD FOR REDUCING MERCURY VAPOR CONTAMINATION OF THE AMBIENT ATMOSPHERE FROM LIQUID MERCURY

Medard F. Karpinski, Parma, Ohio, assignor to Kenneth F. Karpinski and Clarence M. Karpinski, both of Parma, Ohio

Filed Mar. 8, 1973, Ser. No. 339,207

Int. Cl.[2] B08B 7/00

U.S. Cl. 134—4 16 Claims

1. A method of reducing mercury vapor contamination of the ambient atmosphere from liquid mercury droplets disposed on an exposed surface, which method comprises the step of applying a metal powder to the surface, the metal being one that will amalgamate with mercury, thereafter scrubbing the surface with water and removing the water from the surface with vacuum means, and passing the vacuumed fluid through a water filter unit to entrap in the filter any amalgamated mercury contained in the fluid, and thereafter coating said surface with a liquid composition which will solidify to a continuous film which is substantially impervious to mercury vapor.

13. A method of reducing mercury vapor contamination of the ambient atmosphere from liquid mercury droplets disposed on an exposed surface, which method comprises, applying a metal powder to said surface, said metal being one that will amalgamate with mercury, and thereafter removing the amalgamated particles from the surface.

3,888,269

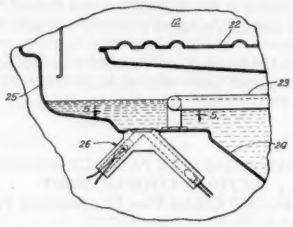
CONTROL SYSTEM FOR DISHWASHER

Larry Thomas Bashark, St. Joseph, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed July 17, 1973, Ser. No. 380,102

Int. Cl. B08b 3/02

U.S. Cl. 134—57 D 13 Claims



1. In a dishwasher having means defining a chamber for holding dishes to be washed, means for providing water fills to said chamber, means for pumping the water against the dishes in the chamber, means for draining the water from the chamber, and means for heating the chamber to dry dishes therein, structure comprising:

means defining a liquid collecting receptacle communicating with said chamber;

sensing means for selectively sensing the turbidity of a water fill in the chamber and the depth of a collected portion of the water fill in said receptacle; and

control means responsive to said sensed turbidity and depth for controlling the dishwashing operation to operate seriatim said water providing means to effect a first fill of the chamber, operate said pumping means to rinse the dishes with the fill water, interrupt the rinse and operate said sensing means to determine the turbidity of the rinse fill water, operate the pumping means to complete the rinse with said fill water, operate the draining means to remove said fill water from the chamber, and selectively a. in the event the level of the sensed turbidity is at or above a preselected level operate said water providing means to effect a second fill of the chamber, operate said pumping means to rinse the dishes with the second fill water, operate the draining means to remove the second fill from the chamber, and permit the dishes to air-dry, or b. in the event the sensed turbidity is below said preselected level operate said heating means to heat dry the dishes in the chamber and evaporate fill water from said receptacle, and terminate the heating step when the sensed depth of fill water in said receptacle drops to a preselected level.

3,888,270

AUTOMATIC DEVICE FOR SURFACE TREATMENT

Jean Crapet, Chevilly Larue, France, assignor to Compagnie Industrielle des Telecommunications Cit-Alcatel, France

Filed Aug. 2, 1973, Ser. No. 384,840

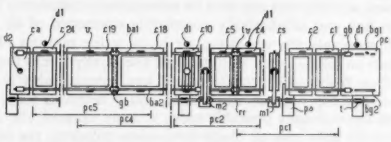
Claims priority, application France, Aug. 2, 1972, 72.27933

Int. Cl. B08b 3/04; B05c 3/14; C23b 5/70

U.S. Cl. 134—57 R 51 Claims

1. An automatic arrangement for treatment of objects comprising: a plurality of alined treatment stations including a loading station and a shaker control station disposed at respective ends of said alined treatment stations, said loading station enabling the supplying of support frame means for carrying the objects to be treated, said shaker control station including a pair of parallelly disposed shaker bars and means for actuating said shaker bars; said shaker bars operatively interconnecting said loading station and said shaker control station; a roller track disposed parallel to said alined treatment stations; at least one mobile unit means for transferring the objects to be treated; means for intermittently moving

said mobile unit means on said roller track, said mobile unit means transferring said support frame means loaded



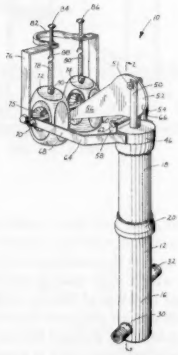
with objects to be treated from one treatment station to another.

3,888,271

MOTION-RESPONSIVE SHUTOFF VALVE

Marshall G. Pettit, 255 E. Sandra, Tulare, Calif. 93274

Filed Mar. 25, 1974, Ser. No. 454,726
Int. Cl. F16k *17/36*
U.S. Cl. 137—45 **6 Claims**



1. In a motion-responsive shutoff valve of the type including a valve housing, means for conducting a flow of fluid through said housing and an axially displaceable closure plug seated in said housing and supported for advancement from a valve-open position to a valve-close position, the improvement comprising:

A. biasing means for continuously urging said closure plug to advance from a valve-open position to a valve-close position;

B. restraining means for restraining the plug from advancement toward said valve-close position including,

a fulcrum, a lever arm supported by said fulcrum characterized by a first end portion connected to said closure plug and a second end portion adapted to be supported against angular displacement about the fulcrum, and means for supporting said second end of said lever arm against angular displacement including a frangible member disposed in supporting engagement with said lever arm; and

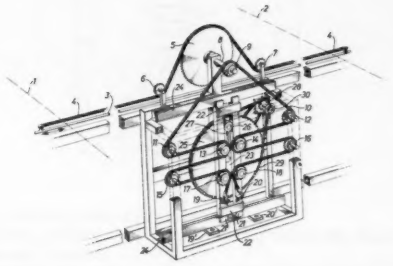
C. means for releasing the closure plug for advancement toward said valve-close position in response to motion imparted to said housing comprising motion-responsive means including a pendulous mass for fracturing said frangible support member.

3,888,272

ACTUATION DEVICE FOR THE WEFT INSERTER ROD OF A LOOM HAVING TWO PARALLEL LOOM BODIES

Sten Herbert Larsson, Hulebacksvagen 20, Molnlycke, Sweden

Continuation of Ser. No. 311,328, Dec. 1, 1972, abandoned.
This application July 26, 1974, Ser. No. 492,098
Int. Cl. D03d *47/00*
U.S. Cl. 139—123 **6 Claims**



1. An apparatus useful for imparting a reciprocable harmonic motion to a weft inserter rod in associated looms having parallel paths of fabric and being laterally separated by a space,

said apparatus comprising in combination

a. a carriage which is arranged in said space and is slidably mounted on guides for horizontal reciprocable movement in a direction transverse to said paths; said guides being mounted to the loom frames,

b. two pairs of chain wheels which are symmetrically journalled on said movable carriage;

c. two other pairs of chain wheels which are stationary and symmetrically journalled on the loom frames;

d. a driven chain wheel which is stationary journalled between said looms, and a driving means for said wheel;

e. a driving pin protruding parallel to the axis of said driving chain wheel and being lockable in desired positions in a radial slot in said driven wheel, said pin extending into a vertical slot in the carriage to impart thereto a simple harmonic horizontal motion, when said driven chain wheel is rotated;

f. a shaft located between said looms and parallel to said axis;

g. a first chain wheel on said shaft;

all said chain wheels being located in a common vertical plane transverse to said paths;

h. a first chain laid over all said chain wheels;

i. means for fixing the ends of said chain on one of said movable carriage and said frame structure, whereby fixing said chain ends on said movable carriage provides a movement gear ratio between carriage and chain of **3**, and whereby fixing said chain ends on said frame structure provides a movement gear ratio between carriage and chain of **4**;

j. a second chain wheel on said central shaft, located in a second plane parallel to said first plane;

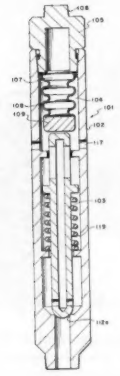
k. a pair of chain-wheels symmetrically journalled on the loom frames in said second plane;

l. a second chain laid over all said wheels in said second plane, said second chain having its ends connected to the end portions of said rod.

3,888,273
VARIABLE ORIFICE GAS LIFT VALVE

Bobby L. Douglas, Houston, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Jan. 21, 1974, Ser. No. 435,051
Int. Cl.[2] F04F *1/20*
U.S. Cl. 137—155 **14 Claims**



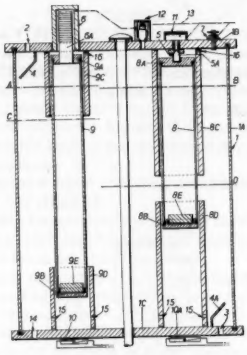
1. A variable flow gas lift valve assembly comprising:
external housing means having an internal longitudinal bore passage therein and a plurality of ports through the wall thereof, said housing means adapted for interconnection in a well tubing string in a well bore;
an elongated valve member located slidably within said housing means and having an inner bore passage partially therethrough;
valve means between said valve member and said housing means;
differential pressure responsive means on said valve member responsive to a differential pressure between a well bore and a tubing string containing said gas lift valve assembly; and,
variable flow orifice means on said valve member arranged to communicate said plurality of ports with said valve means through a variable flow area inversely proportional to said differential pressure acting on said pressure differential responsive means.

3,888,274
AIR BLEEDING DEVICE FOR A PRESSURISED LIQUID SUPPLY SYSTEM

William A. Weston, Dunalastair House, Crawford, Scotland

Filed Nov. 8, 1973, Ser. No. 414,526
Claims priority, application United Kingdom, Nov. 9, 1972, 51713/72
Int. Cl. F16k *31/22, 45/02*
U.S. Cl. 137—174 **3 Claims**

1. An air bleeding device in the fuel supply system of a fuel injection engine, said fuel system including a fuel injection pump, and said air bleeding device comprising a closed tank, side wall means and a top wall and a bottom wall forming said tank, means defining a fuel inlet in said tank, and means defining a fuel outlet in said tank connected to said fuel injection pump, an automatically operating air bleed valve in said top wall of the tank, a float in said tank for controlling operation of said valve and effecting opening of the valve when fuel in the tank, due to the presence of air trapped in the tank, drops below a predetermined level considerably spaced from said top wall, and a manually operable air bleed valve in said top wall opening directly into said tank; whereby, during filling of said tank with fuel, said manually operable bleed valve can be temporarily opened to permit the escape of air from said tank after the fuel has risen to said predetermined level and the automatically operating air bleed valve has closed, and the tank can thus be substantially completely filled with fuel and substantially completely evacuated of air, and said automatically operating air bleed valve remains closed unless an intake of air into the tank eventually forces the fuel to drop below said predetermined level considerably spaced from said top wall, at which time, and at intervals thereafter until the manually operable valve is again opened, the automatically operating air bleed valve opens to permit the escape of air and then closes when incoming fuel raises the level of



the fuel in the tank, and said level continues to rise until the pressure inside the tank equals the pressure applied to the fuel entering the tank, so that the automatically opening valve does not hunt, and in which said tank is provided with a switch which is connected to a signal device, and is provided with a second float which has an actuator for actuating said switch and thus the signal device if the fuel falls to a second and lower predetermined level, and said tank is provided with a second switch which is connected to a fuel supply cut-off device for cutting-off the outlet of fuel from the tank, and said first mentioned float is provided with an actuator for actuating said second switch and thus said cut-off device for the fuel supply if the fuel falls to a third and still lower predetermined level.

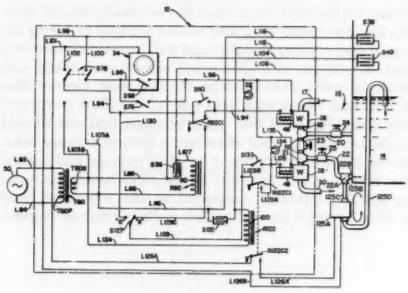
3,888,275
FLUID FLOW SYSTEMS

George E. Sanner, Sparks, Md., assignor to Santron Corporation, Towson, Md.

Continuation-in-part of Ser. No. 322,384, Jan. 10, 1972, Pat. No. 3,809,116, which is a division of Ser. No. 272,793, July 18, 1972, Pat. No. 3,848,616, which is a continuation-in-part of Ser. No. 18,829, March 12, 1970, abandoned, which is a division of Ser. No. 456,787, May 18, 1965, Pat. No. 3,500,844. This application Nov. 6, 1973, Ser. No. 413,255
Int. Cl. E03b *11/16*
U.S. Cl. 137—391 **12 Claims**

1. A fluid flow system comprising first and second conduits; first and second flow effecting means for controlling flow through said conduits; and control means operable in one selectable mode to so regulate the operation of said flow effecting means as to limit flow through each of said conduits to periods in which there is no flow in the other of said conduits and in a second selectable mode to so regulate the opera-

tion of the flow effecting means as to make the flow through said conduits independent so that there may be effected



through one or the other of said conduits only or through both of said conduits.

3,888,276

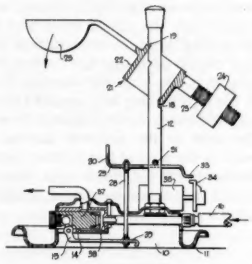
WATER CUT-OFF MEANS

Ian Richard Wannan, Eden Hills, Australia, assignor to Wannan Industries Pty. Ltd., Australia

Filed Nov. 29, 1973, Ser. No. 420,258

Int. Cl. F16k *31/44*

U.S. Cl. 137—402 **6 Claims**



1. Water cut-off means comprising a base having an upstanding post, a valve secured to the base, a valve operating arm extending from the valve and movable to open or close the valve, a lever arm pivotally movable with respect to the base having a tray on one end of the lever arm and a counterweight threadably engaging the other end of the lever arm, a pair of diametrically opposite notches in side wall of the post spaced axially from each other, said lever arm having a sleeve intermediate its ends, the sleeve being of greater diameter than the post and arranged to be supported with diagonally opposite edges of the sleeve engaged in respective notches when the sleeve is inclined relative to the post, but to be pivoted out of said notches upon a quantity of water entering the tray and thereupon to descend down the post and move the valve operating arm so as to close the valve.

3,888,277

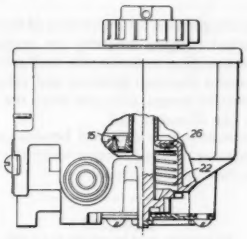
FUEL OIL FLOW CONTROLS

Laurens Zonneveld, Renkum, and Eugene Ehs, Nijmegen, both of Netherlands, assignors to Controls Company of America, Schiller Park, Ill.

Filed Nov. 23, 1973, Ser. No. 418,412

Int. Cl. F16k *11/02*

U.S. Cl. 137—405 **1 Claim**



1. An oil flow control device comprising

a housing defining therein a chamber for containing oil and having an outlet,

a metering disc having a plurality of apertures therein, the metering disc being movable to bring any selected one of its apertures into register with the outlet, and

a brush mounted within the housing separate from the orifice in engagement with said metering disc and said apertures in the disc as the disc is moved whereby dirt particles are dislodged from the apertures by the brush.

3,888,278

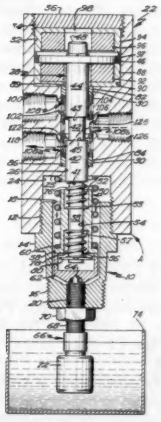
THERMAL-MAGNETIC SNAP ACTION VALVE

James V. Hanks, Minneapolis, Minn., assignor to Horton Manufacturing Co. Inc., Minneapolis, Minn.

Filed Nov. 29, 1973, Ser. No. 420,297

Int. Cl. F16k *11/07, 31/00, 1/06*

U.S. Cl. 137—625.65 **2 Claims**



1. A snap action valve comprising:

a. a valve housing having

b. inlet, outlet and service ports

c. a valve member carried by said housing and movable in opposite directions to selectable positions to connect said service port with either said inlet port or said outlet port,

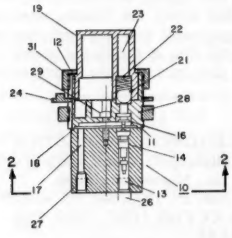
d. magnetic means mounted in said housing and including cooperating
e. attracting and attractable magnetic members
f. two of one type of said magnetic members being fixed relative to said housing,
g. one of the other type being movable relative thereto and fixed relative to said valve member,
h. guide means for guiding the movable magnetic member for movement toward or from the fixed magnetic member,
i. valve operating means for movement of the valve member to a selected position whereby the magnetic means is brought into action to accelerate such movement,
j. resilient means disposed between said valve member and valve operating means, effective when the valve member moves in one direction and
k. other resilient means disposed between said valve and valve operating means effective when the valve member moves in the opposite direction.

3,888,279

FLUIDIC SELECTOR VALVE

Albert R. Hiler, Lakewood, Colo., assignor to Sandoz, Inc., E. Hanover, N.J.

Filed Sept. 28, 1973, Ser. No. 401,925
Int. Cl. F16k *11/14*
U.S. Cl. 137—627 **1 Claim**



1. A fluidic selector valve device comprising in combination a switch body, a plurality of valve chambers in the switch body, a fluidic valve removably secured in each of the valve chambers, a valve actuator slidably received in each of the valve chambers, a port in the body in fluidic communication with the valve chambers, a rotatable valve selector slidably secured to the switch body, the selector comprising a housing and a chamber in the housing with a ball and spring in the chamber, the selector when rotated aligning the ball and spring housing such that the spring actuates the ball to compress the valve actuator to engage and open the valve to emit a fluid to the port.

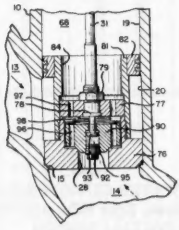
3,888,280

BI-DIRECTIONAL PRESSURE BALANCED VALVE

Ralph W. Tartaglia, Bethel Park, Pa., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Filed Aug. 20, 1973, Ser. No. 389,687
Int. Cl. F16k *1/32*
U.S. Cl. 137—630.13 **2 Claims**

1. A valve assembly comprising: a body having two flow ports fluidly connected by a cylindrical valve control chamber; a first annular valve seat on the body between the control chamber and one of the flow ports; a cylindrical valve closure disc in the chamber having a first seating surface on the lower portion thereof and axially movable therewithin between an open position wherein said first seating surface is spaced from the first valve seat to permit fluid flow between the ports and a closed position wherein said seating surface sealingly engages said first annular valve seat to prevent flow past the seat between the ports; a cylindrical first bore coaxially formed in the upper portion of the closure disc; a hollow member rigidly coaxially connected at a lower end to the closure disc, said hollow member having an enlarged downwardly opening second bore at the lower end adjacent the first bore and defining therewith an annular chamber with axially spaced surfaces; means carried by the hollow member in axially spaced relationship to said closure disc, said means slidably engaging the surfaces of said control chamber and guiding said closure disc for axial movement in said control chamber between said positions; an axial fluid passage through said closure disc connecting said bores with said one of the flow ports and defining a supplemental flow path between said one of said flow ports and said control chamber; a second annular valve seat on the closure disc between the fluid passage and coaxial with the first bore; a cylindrical check valve having an outer surface slidably guidably supported in the first bore, said check valve having a second seating surface thereon engageable with the second valve seat and normally adapted to open or close said fluid passage through said closure disc in response to pressure changes in said ports and said control chamber; a valve stem; means for moving said valve stem in opposite directions; an actuator member slidably supported in the second bore and connected to said valve stem for lost motion movement between said axially spaced surfaces; fluid passages associated with the check valve and the actuator member for providing fluid communication therethrough between said one of said ports and the control chamber; end means projecting from the actuator member freely slidably associated with the check valve at a second lost motion connection, whereby said check valve is isolated from any guiding influence of the stem or the actuator member during lost motion movement at the second lost motion connection, said end means effective to lift the check valve from said second valve seat after said lost motion movement at said second lost motion connection.



3,888,281

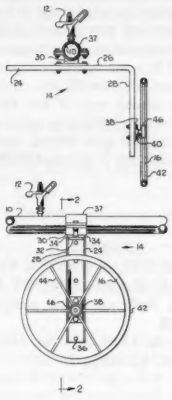
ONE WHEEL PULL-TYPE IRRIGATION SYSTEM

Rufus J. Purtell, Brownfield, Tex., assignor to Tri-Matic, Inc., Brownfield, Tex.

Filed Nov. 2, 1973, Ser. No. 412,501
Int. Cl. A01g *25/02*; **B05b** *15/06*
U.S. Cl. 137—344 **12 Claims**

1. In an agricultural irrigation system having
a. an elongated pipe adapted
i. to carry water under pressure, and
ii. to discharge the water by sprinklers upon the land to be irrigated,
b. an end vehicle at each end of the pipe, and
c. a plurality of intermediate vehicles movingly supporting said pipe;
d. the improvement in said intermediate vehicles comprising:
e. each vehicle having only a single wheel,

f. said wheel contacting the ground to one side of the pipe and spaced therefrom, and



g. each wheel about equally spaced from wheels along the pipe on the opposite side thereof.

3,888,282

SERVICE COLUMNS

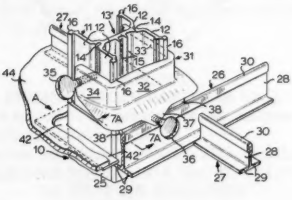
Jack Anthony Liddall, Mississauga, Ontario, Canada, assignor to Linac Systems International Ltd., Agincourt, Ontario, Canada

Filed July 16, 1973, Ser. No. 379,592

Claims priority, application United Kingdom, Nov. 28, 1972, 55011/72

Int. Cl. F16l *3/02, 3/10, 3/12*

U.S. Cl. 138—106 **14 Claims**



1. In combination, a service column, a ceiling structure, and a securement device releasably mounting the service column to the ceiling structure, wherein the service column comprises a core provided with a longitudinally extending service channel having a longitudinally extending open face, and a removable cover mounted on said open face, and the securement device securely embraces the column transversely thereof without overlying said service channel, the securement device being connected to the ceiling structure.

3,888,283

TAPERED POLE MADE OF VARIABLE WIDTH METAL STRIPS

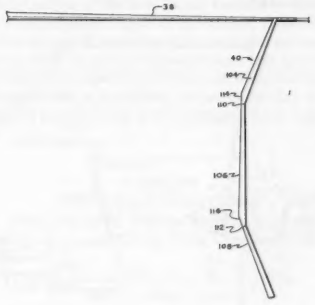
Ford B. Cauffiel, 4940 Homerdale Ave., Toledo, Ohio 43623

Division of Ser. No. 212,228, Dec. 27, 1971, Pat. No. 3,771,978. This application Sept. 7, 1973, Ser. No. 394,965

Int. Cl. F16l *9/16*

U.S. Cl. 138—150 **2 Claims**

1. A tapered pole made from a plurality of ductile metal strips, each strip being of increasing width from one end to the other, said strips joined together and being wound in a generally helical manner but with the angles of the strips relative to the axis of the pole narrowing from one end of the strips to the other, the first of said strips being wound with edge portions of each wrap of the strip affixed to edge portions of adjacent wraps, and the second strip being wound over the first strip and having edge portions of each wrap affixed to edge portions of adjacents wraps, the edge portions of the second strip being set off to the side of the edge portions of the first strip at least through a substantial portion of their lengths, the wraps of both of said strips increasing in size from one end to the other.



3,888,284

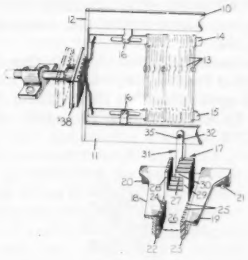
LOOM HARNESS MECHANISM

Stanley C. Tiernan, Bellingham, and Ronald Berry, Hopedale, both of Mass., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Filed Oct. 19, 1973, Ser. No. 408,024

Int. Cl. D03c *13/00*

U.S. Cl. 139—82 **4 Claims**



1. In combination with a loom having a plurality of harness frames with guideways disposed at each side thereof for guiding the harness frames during vertical reciprocation thereof, an improved means for transmitting a loom's shedding motion to the harness frames, comprising:

a. a harness sheding drive plate for each of the harness frames disposed for vertical reciprocation below and in alignment with the harness frame individual thereto;

b. a linkage member disposed in communication with each harness frame and drive plate which includes;

i. an elongated body portion having a first end attached to the lower exterior surface of a harness frame:

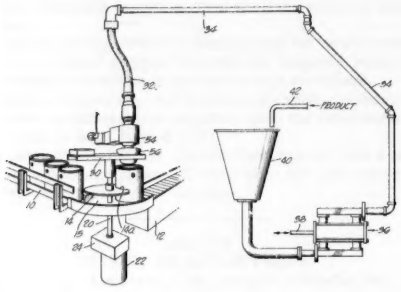
ii. a second end interconnecting and removably associated with its respective drive plate; and

iii. means for placing said linkage member into driving engagement with its drive plate for transmitting the motion of the latter to its respective harness frame.

3,888,285
CONTAINER FILLER APPARATUS

George Ashton, 12274 Laurel Terrace Dr., Studio City, Calif. 91604

Filed Oct. 23, 1973, Ser. No. 408,627
Int. Cl. B65b 43/42
U.S. Cl. 141—168 5 Claims

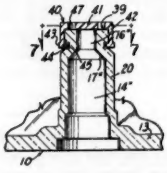


1. A machine for automatically filling each of a succession of containers with liquid, said machine comprising: transferring means; means for moving the containers in succession to said transferring means to be successively transferred thereby; a bracket mounted over said transferring means and movable therewith; a flexible hose having a spout at one end supported in said bracket and movable therewith to be disposed directly over the container transferred by said transferring means; a source of liquid displaced from said transferring means; and a pipeline displaced from said transferring means and extending from said source to the other end of the flexible hose to suspend the flexible hose over the bracket and for introducing liquid to the hose to be filled into the containers.

3,888,286
UNITARY RESILIENT SEALING VALVE

Harry L. Vaughan, Lawrenceville, Ga., assignor to Scripto, Inc., Atlanta, Ga.

Division of Ser. No. 89,257, Nov. 13, 1970, abandoned, which is a continuation of Ser. No. 310,396, Nov. 29, 1972, Pat. No. 3,841,366. This application Nov. 29, 1972, Ser. No. 310,397
Int. Cl. B65b 3/04; B67c 3/02
U.S. Cl. 141—291 4 Claims

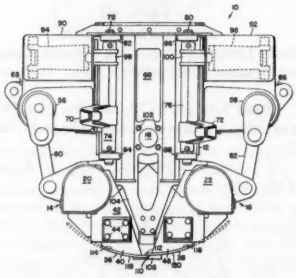


1. A fill valve for a lighter having a reservoir containing a supply of fuel therein and fill port means communicating with the reservoir adapted to receive a charging apparatus therein for introducing fuel into the reservoir and with the fill port means having a fuel flow passage extending therethrough to an apertured inner end surface and a circumferential outer surface disposed within said reservoir extending longitudinally from said inner end surface and having a circumferential groove therein, said fill valve comprising a resilient or elastic cap having a circumferential body portion fitted annularly outside the fill port and having an inwardly directed flange thereon for snap fitting engagement within said circumferential groove and about at least a portion of said fill port circumferential outer surface and a flexible top portion defining at least one passageway therethrough offset from said fuel flow passage and overlaying said fill port apertured end surface so that said fill port apertured end surface is normally sealably closed by the non-apertured part of said flexible top portion whereby a charging apparatus may be inserted in the fill port means and engage and flex the resilient cap top portion away from sealing engagement with the fill port end surface thereby opening the normally closed end of the fill port means to permit a flow of fuel from the charging apparatus through the fuel flow passage of the fill port means and the apertured passageway of the flexible top portion of the resilient cap and into the reservoir.

3,888,287
BLADE FOR TREE SHEAR HAVING VERTICALLY SWINGABLE BLADE SUPPORT ARMS

Earl Clinton Johnson, Bellevue, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Apr. 10, 1974, Ser. No. 459,538
Int. Cl. A01q 23/08
U.S. Cl. 144—34 E 4 Claims

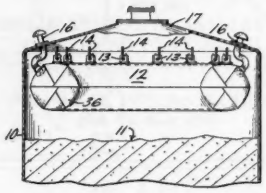


1. In a tree shear head of a type including a main support frame, a pair of blade support arms pivotally mounted on the frame for pivotal movement about an axis which extends horizontally when the frame is in an upright position, a pair of plate-like shear blades respectively fixed to the pair of support arms and being curved so as to be on respective radii emanating from said axis, said blades having respective beveled cutting edges which extend parallel to said axis and which are movable with said blade arms between an open position, wherein they are spread apart a distance slightly greater than the diameter of the largest tree to be severed, and a closed position wherein they are slightly overlapped, power-operated means connected to the blade support arms for swinging them towards and away from each other; and each of said blades, with reference to said axis, including inner and outer curved surfaces located on respective radii emanating from said axis with said cutting edge being formed by converging inner and outer planar surfaces respectively extending outwardly and inwardly from said inner and outer curved surfaces, the improvement comprising: the ratio of the area of the inner planar surface to the area of the outer planar surface being no greater than about 0.5 and the included angle formed at the intersection of the inner and outer planar surfaces of each blade being no less than about 45°.

3,888,288
SILO BREATHER BAG

Jerry J. Hickle, and Robert D. Sherbourne, both of Findley, Ohio, assignors to R. L. Kuss & Co., Inc., Findlay, Ohio

Filed Jan. 28, 1974, Ser. No. 436,906
Int. Cl. A45c 9/00; B65b 3/00; B65d 25/02
U.S. Cl. 150—1 3 Claims

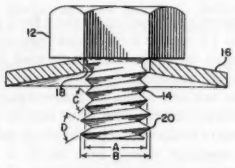


1. A tubular silo breather bag for use in a hermetically-sealed silo, comprising two sheets of material defining a top and a bottom, each sheet having a first arcuate edge, a second arcuate edge of shorter arcuate length and sharper curvature than said first edge, and two ends having serrated edges defining, at each end of the breather bag, pairs of opposed two and three sided projections, said two sheets being sealed together at corresponding arcuate edges and at adjacent edges of adjacent projections with the projections converging generally centrally at each end of said joined sheets, the projections in each pair being similar with at least one projection of a different shape located therebetween, one pair of projections being of length sufficient to form an overlapping sealed portion of corresponding opposed edges of the pair, the remaining sealed edges defining staggered noncoextensive lines, all of said projections when in sealed relationship forming a generally polygonal end with not more than three projections being contiguous to any one point, said assembled sheets forming an arcuate weiner-like inflatable bag, said bag having an air duct extending from one of said two sheets for connection to an opening in the silo.

3,888,289
PREASSEMBLED FASTENER UNIT

Richard Lee Reynolds, Carpentersville, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Division of Ser. No. 334,512, Feb. 21, 1973, abandoned. This application May 17, 1974, Ser. No. 471,091
Int. Cl.[2] F16B 33/02, 39/24
U.S. Cl. 151—38 4 Claims

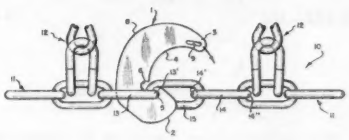


1. A preassembled composite fastener unit, for association with an apertured workpiece, comprising an apertured spring washer, and a screw type fastener having a shank extending through the washer aperture and a head presenting a clamping surface to the adjacent face of the washer; said shank having a first utility helical thread formation extending from adjacent the head clamping surface along a limited axial extent of the shank and of a predetermined crest diameter permitting free relative movement between the same and the surface of the washer aperture, and a second utility helical thread formation along a remaining portion of the shank and of a crest diameter at least adjacent the first thread formation slightly greater than the predetermined crest diameter of the first thread formation in interfering relation with the washer body around the aperture therein for trapping the washer on the shank in the region of the first thread formation, the root diameters of the first and second thread formations being substantially equal, the included flank angles of the first thread formation being greater than the included flank angles of the second thread formation wherein the second thread formation provides primary thread engagement with an associated workpiece and contributes to the clamping force capability of the unit while the first thread formation provides a prevailing torque capability to the unit in addition to contributing to the clamping force capability of the unit.

3,888,290
TIRE CHAIN TIGHTENER

Daniel E. Hess, and David William Bannier, both of York, Pa., assignors to American Chain Cable Company, Inc., Bridgeport, Conn.

Filed Dec. 1, 1972, Ser. No. 311,096
Int. Cl. B60c 27/10
U.S. Cl. 152—217 7 Claims



1. A tightening device for shortening the length of a chain, comprising:

a. a flat plate like member of unitary structure having:

1. open ended slot attaching means disposed at one end for removably receiving the first link of a chain to permit rotation of the member about said link,
2. a handle defined by the other end of the member, said handle being adapted to be inserted through a second link spaced from the first link upon rotation of said member about the end of the first link,
3. a concave surface extending along one edge of said member from said handle toward said first attaching means, said concave surface defining a camming surface for engaging the inner surface of the end of the second link and drawing it toward the first link as the handle is moved through the second link and the member is pivoted about the first link, and
4. locking means at the end of the camming surface adjacent the attaching means for receiving the end of the link as it moves along said camming surface toward the first link, said attaching and locking means being spaced from each other to hold the first and second links in shortened spaced relation when received thereby.

3,888,291
MOLDED OR CAST TIRES AND METHODS OF MANUFACTURE

Harold J. Herzlich, Wellingord, and Paul F. Fitzgerald, West Haven, both of Conn., assignors to The Armstrong Rubber Company, New Haven, Conn.

Filed Dec. 12, 1973, Ser. No. 424,097
Int. Cl. B60c 5/00, 9/00
U.S. Cl. 152—330 R 11 Claims

7. A pneumatic tire for vehicles comprising a tire casing formed essentially of a cast segmented thermoplastic copolyester elastomer including recurring polymeric long-chain ester units derived from dicarboxylic acids and low molecular weight diols, said thermoplastic elastomer having a medium to high durometer range of hardness, a tensile strength of about

6000 psi at room temperature and a melting point in the vicinity of 400°F, and a tread of conventional tread-rubber

stock integrally bonded to said tire casing and cured on said tire casing with a bonding agent at the interface of said tread and casing that contains a non-volatile isocyanate.

3,888,292

PNEUMATIC VEHICLE TIRE

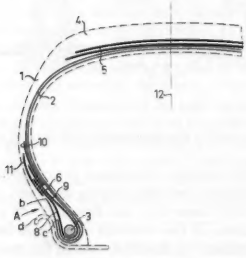
Hans Menell, Ahlem, and Rach Heinz-Dieter, Garbsen, both of Germany, assignors to Continental Gummi-Werke Aktiengesellschaft, Hannover, Germany

Filed July 12, 1973, Ser. No. 378,418

Claims priority, application Germany, July 14, 1972, 2234657

Int. Cl. B60c *15/06*

U.S. Cl. 152—362 **4 Claims**



1. A pneumatic vehicle tire provided with bead cores, which includes in combination a circumferential belt, a radial carcass, and core flags formed by steel cables arranged substantially parallel to each other and folded in a U-shaped manner around said bead cores, the rims of said carcass being looped around said core flags so as to anchor said carcass rims on said bead cores, and said steel cables which form said core flags extending at an acute angle inclined with regard to the tire circumferential direction of the tire and at least a part of the free ends of the carcass rims facing the outer surfaces of the tire side walls, and leg portions of said core flags which are adjacent to the interior of said tire as well as those portions of said core flags which are adjacent to the outside of said tire being symmetrically arranged with regard to the central tire plane perpendicular to the axis of rotation of said tire.

3,888,293

METHOD OF MAKING A FOUNDRY CORE

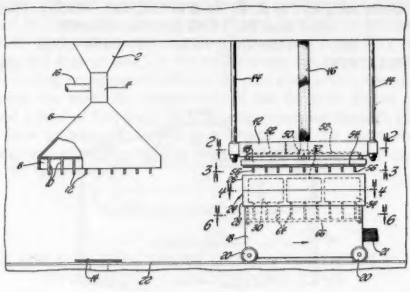
Henry A. Laforet, and Michael J. Zusack, both of Sarnia, Ontario, Canada, assignors to American Motors Corporation, Detroit, Mich.

Filed Apr. 20, 1973, Ser. No. 353,176

Int. Cl. B22c *9/12*

U.S. Cl. 164—16 **37 Claims**

27. A method for making a foundry core comprising mixing a foundry aggregate with a curable binder, shaping the mixture to form a green body; providing a ready, continuous supply of a pressurized vapor solution of a liquid curing agent in an inert carrier gas; introducing under pressure a first gas comprising said pressurized staurated vapor solution into said body; and immediately thereafter introducing a second gas under greater pressure into said body while inhibiting the escape of said first gas and said second gas from said body so



as to force said first gas throughout said body, thereby uniformly and completely curing said binder.

3,888,294

METHOD OF CONTINUOUSLY CASTING STEEL

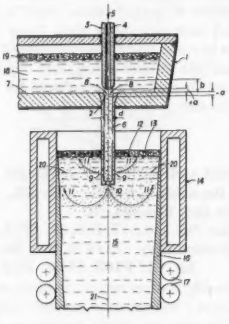
Thorwald Fastner; Alois Niedermayr, and Ernst Bachner, all of Linz, Donau, Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke - Alpine Montan Aktiengesellschaft, Linz, Austria

Filed May 24, 1974, Ser. No. 473,212

Claims priority, application Austria, June 14, 1973, 5223/73

Int. Cl. B22d *11/10*

U.S. Cl. 164—66 **14 Claims**



1. In a continuous steel casting method for a casting capacity of more than 1.5 metric tons of steel per minute, wherein at least one stream of molten steel is formed and cast into a vertically arranged, substantially rectangular mold, having a larger transverse axis and a smaller transverse axis, through a casting tube having a certain clear cross section and extending to below the level of molten steel in the mold, said casting tube having lateral openings whose axes lie in a vertical plane running through the larger transverse axis of the mold, and wherein said at least one stream of molten steel contains inert gas, the improvement comprising

casting the at least one stream of molten steel, having a certain cross section, through a casting tube provided, in addition to the said lateral openings, with at least one bottom opening directed vertically downward, said at least one bottom opening having a cross section smaller than the clear cross section of the casting tube and the cross section of the stream of molten steel, the axes of the said lateral openings being inclined by between 70° downward and 90° upward in relation to the horizontal and the total cross section of the lateral openings and of the at

least one bottom opening being at least equal to the clear cross section of the casting tube, and

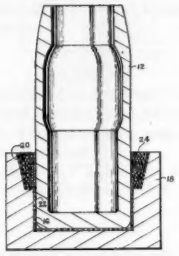
supplying the said inert gas to the said at least one stream of molten steel in an amount of 1 to 15 Ncm^3/kg steel over the entire cross section of the stream of molten steel at the place of origin of said at least one stream of molten steel above the mold.

3,888,295

METHOD OF BONDING AN ANNULAR BAND OF MATERIAL TO AN OBJECT

David E. Schillinger, 5235 Montour Street, Philadelphia, Pa. 19124

Filed Oct. 29, 1973, Ser. No. 410,862
Int. Cl. B22c *3/00*
U.S. Cl. 164—72 **3 Claims**



1. A method of bonding a rotating band to a projectile shell which has a higher melting point than the band material and a portion of substantially uniform outside diameter comprising the steps of

placing the shell into a refractory graphite mold having an annular cavity which surrounds the shell and a close-fitting nest which receives said portion of said outside diameter,

loading the annular cavity with band material so as to constitute an assembly of the mold, shell, and band material, heating the assembly by induction heating until the band material melts, the annular cavity being constructed such that when the band material is melted it will flow to and fuse to the adjacent annular surface of the shell, and

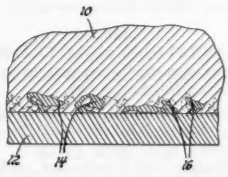
allowing the banded shell to cool.

3,888,296

METHOD FOR THE MANUFACTURE OF A COMPOSITE ARTICLE

Peter Vernia, Rochester, and James C. Holzwarth, Birmingham, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed May 30, 1974, Ser. No. 474,415
Int. Cl. B22d *19/02*
U.S. Cl. 164—97 **4 Claims**



1. Method of producing a composite metal article comprising an aluminum body having a ferrous metal layer attached thereto comprising the steps of:

applying a mono particle layer of ferrous metal machining chips on the surface of a ferrous metal layer;

brazing said chips to said ferrous metal layer;

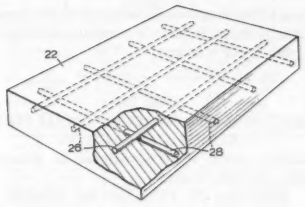
die casting said aluminum body onto said chips whereby the molten metal enters the interstices of said chips and on solidification the aluminum body is mechanically attached to said ferrous layer.

3,888,297

METHOD OF PRODUCING FERROUS CASTINGS WITH CAST-IN FERROUS INSERTS

Barry J. Davies, Hamilton, Canada, assignor to Canron Limited, Montreal, Quebec, Canada

Filed Nov. 2, 1973, Ser. No. 412,177
Int. Cl. B22d *19/00*
U.S. Cl. 164—100 **1 Claim**



1. A method of producing ferrous castings with cast-in ferrous metal inserts comprising the steps of

a. preparing the surface of the ferrous metal insert which is to be cast-in to receive a bondable coating,

b. applying at least one coat of a coating composition consisting of finely divided macroscopic vitreous silica dispersed in an aqueous silica sol containing a binder to the surface of the ferrous metal insert and allowing the coating to dry to form a hard nonyieldable refractory coating which prevents carburization and fusion during the casting step,

c. locating the coated insert in a mold in a manner such that it cannot be displaced during casting,

d. casting a ferrous metal about said refractory coated insert, said refractory coating preventing carburization of the insert and fusion of the insert with respect to the casting.

3,888,298

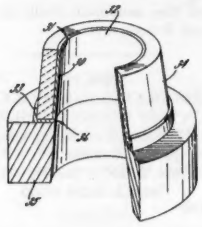
PRODUCTION OF INGOTS

Kenton Parkes Cooley, Fairfield, Conn., and Edward John Jago, Berea, Ohio, assignors to Foseco International Limited, Birmingham, England

Continuation-in-part of Ser. No. 234,029, March 13, 1972, which is a division of Ser. No. 103,681, Jan. 4, 1971, Pat. No. 3,672,427. This application Mar. 22, 1974, Ser. No. 453,671
Int. Cl. B22d *7/10*
U.S. Cl. 164—137 **1 Claim**

1. In the lining of a head box for an ingot mould wherein the head box has an inner contour surface to be lined and an outside surface joined by a bottom surface adapted to rest on the upper surface of the ingot mould and wherein molten metal contacts a lining element, the method which comprises locating within the head box at least one lining element selected from the class consisting of lining slabs and sleeves of a deformable refractory composition, the lining element extending about the inner and bottom surfaces of the head box and the edge of the lining element terminating adjacent the outside surface thereof, securing the edge of the lining element to the outer surface of the head box by applying force in such a way as to deform the edge to the outside surface, assembling the head box on the ingot mould so that the lining

element forms a seal between the head box and the ingot mould, and charging molten metal into the assembled ingot mould and head box whereby the lining element about the



inner surface of the head box is deformed to the contour of the inner surface by the metallostatic pressure of the molten metal contacting the lining element.

3,888,299

MACHINE FOR THE PRODUCTION OF FOUNDRY CORES AND MOULDS

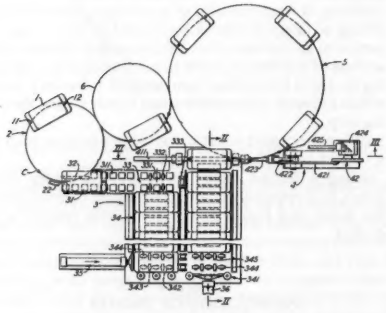
Gerard Bardet, Paris, France, assignor to Automatisme et Technique, Arcueil, France

Filed Mar. 22, 1973, Ser. No. 343,820

Claims priority, application France, June 29, 1972, 72.23555

Int. Cl. B22c *11/04*

U.S. Cl. 164—228 **10 Claims**



1. A machine operable in a continuous kinematic manner for the production of foundry cores with the aid of core boxes, the machine comprising a first continuously rotating barrel for introducing into the core boxes a mixture of sand and a polymerization constituent, a treatment chamber maintained at a predetermined temperature and having an inlet and an outlet, means for delivering core boxes in succession from said barrel to the inlet of said chamber, means for carrying the boxes through the treatment chamber for hardening the mixture in them, a second continuously rotating barrel for ejecting cores from the boxes as it carries them in a circular path faster than they are carried through the treatment chamber, accelerating means for receiving each successive box from the outlet of the treatment chamber and delivering the box to said second barrel along a path tangent to said circular path of the boxes, said accelerating means being formed and constructed to accelerate the speed of each box as it moves toward said second barrel until said speed matches the speed of the boxes moving in said circular path, and a transfer barrel for returning emptied boxes from said second barrel to said first barrel, whereby the boxes travel in a closed circuit continuously.

3,888,300

APPARATUS FOR THE CONTINUOUS CASTING OF METALS AND THE LIKE UNDER VACUUM

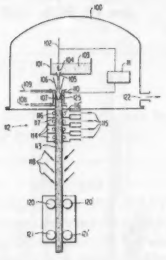
Claude Guichard, Voiron, and Jean-Claude Soret, Saint Egreve, both of France, assignors to Societe Anonyme: Societe Industrielle de Combustible Nucleaire

Continuation-in-part of Ser. No. 153,266, June 15, 1971, abandoned. This application Jan. 23, 1973, Ser. No. 326,056

Claims priority, application France, June 15, 1970, 70.21933

Int. Cl. B22d *27/16*

U.S. Cl. 164—256 **10 Claims**



1. In a device for the continuous casting of metals or metal alloy materials under vacuum, or under a controlled atmosphere, where degasing of the materials is required and/or the materials react easily with the surrounding air when they are hot, including a tundish for molten metal which is maintained under a vacuum, or under a controlled atmosphere; and interchangeable ingot mold associated with said tundish and equipped with a water cooling system and a level detecting device for detecting the level of molten metal in said mold; a dynamic air lock comprising a plurality of interconnected vacuum chambers whose inside pressures are reduced by means of a large capacity vacuum pump, the vacuum chambers being separated from one another by means of diaphragm walls having aligned apertures to permit passage of material from said mold, and support rollers mounted for rotation on shafts arranged in each vacuum chamber of the dynamic air lock on opposing sides of said diaphragm wall apertures, cooling means for cooling said support rollers and centering means for adjusting the position of said rollers to center said material with respect to said diaphragm wall apertures; a water spray means arranged at the outside of the dynamic air lock; and means for maintaining constant the static pressure in the metal which exists at the level of the dynamic air lock by adjusting the level of molten metal in the ingot mold in response to the output from said level detector, so as to maintain within a predetermined tolerance the difference obtained between the cross-section of the cast product and the diaphragm wall apertures.

3,888,301

MULTI-PART MOLD CLAMP

Douglas R. Hayes, Vernon, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.

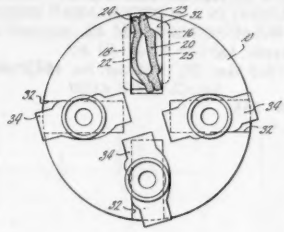
Filed June 7, 1974, Ser. No. 477,534

Int. Cl. B22d *33/04, 25/06*

U.S. Cl. 164—341 **6 Claims**

1. The combination with a multi-part, preformed mold for making castings, said mold being in at least two longitudinal parts and having an open end to rest on a chill plate and also having a peripheral flange at said open end, of a plate having at least one slot therein to hold said mold on the chill plate, said slot being dimensioned to receive the multi-part mold

therein and to engage opposite sides thereof such that the parts are held in operative assembled relation, said plate rest-



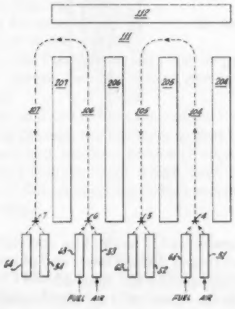
ing on and engaging said peripheral flange to hold the latter against the chill plate.

3,888,302

METHOD FOR REMOVING DEPOSITS FROM INTERIOR SURFACES OF REGENERATIVE HEAT EXCHANGERS

Gerald L. Rounds, Fontana, Calif., assignor to Kaiser Steel Corporation, Fontana, Calif.

Filed Oct. 1, 1973, Ser. No. 401,993
Int. Cl. F28g *13/00*
U.S. Cl. 165—1 **10 Claims**



1. In a regenerative heat exchanger having heat exchange surfaces on which deposits, including metal oxides, have formed, a method for removing said deposits from said surfaces while maintaining said regenerative heat exchanger in operation comprising the steps of maintaining said heat exchanger substantially at operating temperatures, causing a gas stream to flow in said exchanger thereby to contact said heat exchange surfaces, introducing a deposit reactive material into said gas stream thereby to carry said deposit reactive material into contact with said deposit for reaction with at least a major portion thereof to form reaction products, and removing said reaction products from said heat exchanger.

3,888,303

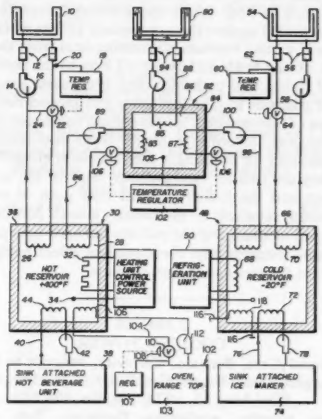
THERMAL EXCHANGE FLUID PREPARATION OF FOODS

Stephen F. Skala, 3839 S. Wenonah, Berwyn, Ill. 60402

Filed Oct. 20, 1972, Ser. No. 299,214
Int. Cl. F25b *13/00*
U.S. Cl. 165—2 **7 Claims**

1. A method for rapidly attaining predetermined temperature levels of a food or beverage substance in a houseware unit by delivering thermal fluid to a chamber of said houseware unit which is connectable to a coupling and valving zone, including the steps of

storing a body of thermal fluid in a thermal reservoir,
attaining desired heat content of the stored body of thermal fluid in said thermal reservoir,
maintaining a desired heat content of the body of thermal fluid stored in said reservoir,
connecting said houseware unit to the coupling and valving zone,



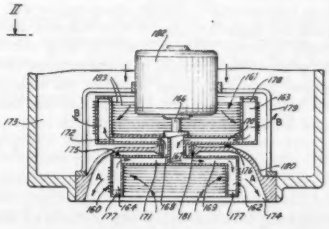
opening said zone to the travelling thermal fluid,
delivering the travelling thermal fluid under pressure along a closed line through the connected open zone to the chamber houseware unit, and
returning said travelling fluid from the houseware unit through the opened connected zone to the thermal reservoir so that a succeeding charge of travelling fluid of desired heat content may be delivered to the houseware unit to attain predetermined temperature levels in said houseware unit.

3,888,304

TEMPERATURE-CONTROL SYSTEM USING THERMOSIPON EFFECT

Nikolaus Laing, Hofener Weg 35-37, 7141 Aldingen, Germany

Division of Ser. No. 847,771, June 17, 1969, abandoned, Continuation-in-part of Ser. No. 802,704, Dec. 11, 1968, abandoned, Continuation-in-part of Ser. No. 585,819, Oct. 11, 1966, abandoned. This application Mar. 13, 1972. Ser. No. 234,433
Int. Cl. F28d *11/00*; **F28f** *5/00*
U.S. Cl. 165—86 **12 Claims**



1. A temperature-control system for a space provided with means for maintaining a first fluid therein at a temperature differing substantially from that of a second fluid in an adjoining environment separated from said space by a wall, comprising:

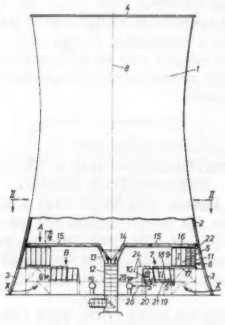
a shaft passing through said wall;
drive means for rotating said shaft; and
a pair of coaxial rotors on said shaft, one of said rotors having a first hollow body disposed in said space for contact with said first fluid, the other of said rotors having a second hollow body disposed in said environment for contact with said second fluid;
said shaft having two passages communicating with the interiors of both rotors and forming therewith a closed path sealed against the atmosphere for the circulation of a heat-carrier medium abstracting heat from the warmer one of said fluids and giving off heat to the colder one of said fluids, said path including first radial extensions of said passages in said first rotor and second radial extensions of said passages in said second rotor, said first radial extensions differing in length from said second radial extensions for creating a thermosiphon effect by lengthening the radially outward flow path of the cooled medium and the radially inward flow path of the heated medium relatively to the radially inward flow path of the cooled medium and the radially outward flow path of the heated medium, said thermosiphon effect being the sole means for circulating said medium.

3,888,305

COOLING TOWER

Hans-Bernd Gerz, Bochum, Germany, assignor to Gea Luftkuhlergesellschaft Happel GmbH & KG, Bochum, Germany

Filed May 31, 1974, Ser. No. 475,151
Claims priority, application Germany, Feb. 8, 1974, 2405999
Int. Cl. F28b 1/06, 9/10
U.S. Cl. 165—113 **13 Claims**



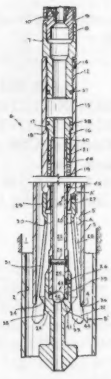
1. A cooling tower for condensation of vaporous media, comprising an upright peripheral tower wall having a lower region with air inlet apertures, and an upper region with an air outlet; at least one upper annulus of first heat-exchange elements inwardly adjacent said wall, and at least one downwardly offset second lower annulus of heat-exchange elements inwardly spaced from said upper annulus, the elements of each annulus being upwardly and inwardly inclined and having upper and lower end portions, and at least some of said elements of each annulus acting as condensers; a supply conduit centrally within the confines of said tower wall for supplying vaporous medium; a plurality of straight connecting pipes radiating substantially horizontally from said supply conduit and communicating with said upper end portions of said first elements; and a plurality of substantially horizontal condensate collecting tubes communicating with said lower end portions of said first elements and also communicating with said upper end portions of said second elements, so as to convey both condensate and vaporous medium from said first to said second elements.

3,888,306

METHOD OF AND APPARATUS FOR POSITIONING AND CORRELATING THE END OF REMEDIAL TUBING IN RELATION TO THE LOWER END OF PRODUCTION TUBING IN A SUBTERRANEAN WELL

Rodney J. Wetzel, St. Martinville, La., assignor to Dixieco, Inc., Lafayette, La.

Filed Mar. 25, 1974, Ser. No. 454,376
Int. Cl.[2] E21B 43/00
U.S. Cl. 166—255 **32 Claims**



1. In a subterranean well, a method for correlating the lower end of production tubing and the lower end of remedial tubing inserted therein, comprising the steps of:

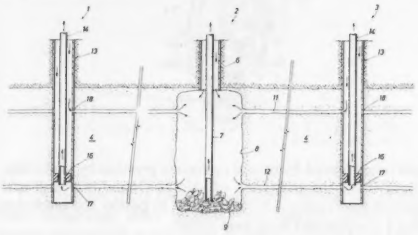
A. Affixing to the lower end of the remedial tubing an apparatus having:
   1. A hydraulically activated member;
   2. Locating means which may be urged outwardly by downward movement of the hydraulically activated member; and
   3. Means for retracting the locating means;
B. Lowering the apparatus affixed to the remedial tubing into the production tubing in the wall to a point at least lower than the lower end of the production tubing;
C. Activating the apparatus by applying fluid pressure through the remedial tubing to the hydraulically activated member to outwardly extend the locating means;
D. Raising the remedial tubing to a point whereby the extended locating means contact the lower end of the production tubing and cause interference with continued upward travel of the remedial tubing;
E. Flagging at the subterranean well surface the interference point determined by Step D.

22. An apparatus for correlation in a subterranean well of the lower end of production tubing and the lower end of remedial tubing inserted therein, comprising: (a) a hydraulically activatable member for initiating correlation; (b) means for locating said lower end of said production tubing, said means being urgeable outwardly by downward movement of the hydraulically activatable member; and (c) means for retracting the locating means upon correlation of said lower tubing ends.

3,888,307
HEATING THROUGH FRACTURES TO EXPAND A SHALE OIL PYROLYZING CAVERN

Philip J. Closmann, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Aug. 29, 1974, Ser. No. 501,535
Int. Cl.[2] E21B *43/24*
U.S. Cl. 166—272 4 Claims



1. In a shale oil producing process in which a relatively solids-free, rubble-containing cavity is formed within an otherwise substantially non-porous and impremeable subterranean oil shale, and fluid is injected into and withdrawn from the cavity, the improvement which comprises:

forming at least two vertically-separated, substantially horizontal fractures that extend between the cavity and at least one adjacent well;

inflowing a hot non-solvent-gas into the cavern through at least one of said fractures;

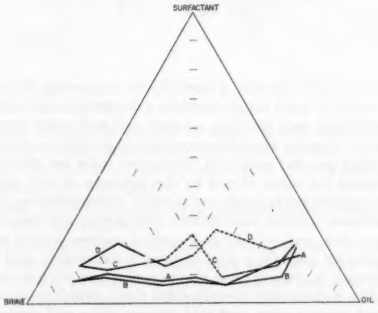
outflowing a hot fluid containing oil shale pyrolysis products from the cavern through at least one other of said fractures; and

adjusting the rate and temperature of the fluid inflowing and outflowing through the fractures so that the fracture walls are heated and become vertically separated, generally planar heat sources from which heat is transferred to portions of the oil shale formation surrounding the walls of the cavity.

3,888,308
USE OF MATERIALS AS WATERFLOOD ADDITIVES

Walter W. Gale, Houston; Thomas L. Ashcraft, Jr., and Rhoderick K. Saunders, both of Baytown, all of Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed Jan. 2, 1974, Ser. No. 430,330
Int. Cl. E21b *43/22*
U.S. Cl. 166—273 25 Claims

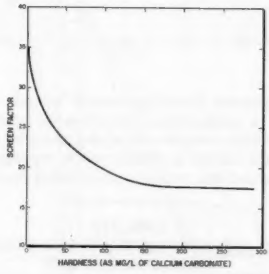


1. In a method of recovering crude oil from a subterranean formation having at least one injection means in fluid communication with at least one production means wherein a displacing fluid is injected into said formation through said injection means to displace crude oil toward said production means and said displacing fluid is driven through said formation by means of a driving fluid, the improvement wherein said driving fluid comprises a single phase, transparent, aqueous solution of a water-soluble, sulfated, polyethoxylated alcohol, said sulfated, polyethoxylated alcohol being present in an amount effective to thicken said driving fluid, and said driving fluid being substantially free of any other thickening agent and any other surface active agent.

3,888,309
POLYMER WATERFLOODING BY CONTROLLING WATER HARDNESS

John S. Rhudy, and William B. Gogarty, both of Littleton, Colo., assignors to Marathon Oil Company, Findlay, Ohio

Filed Aug. 17, 1973, Ser. No. 389,082
Int. Cl. E21b *43/22*
U.S. Cl. 166—274 12 Claims



1. In a process of recovering hydrocarbon from a hydrocarbon-bearing subterranean formation wherein an aqueous polymer solution containing a salt-sensitive polymer is injected into the formation and displaced toward a production means in fluid communication with the formation to recover hydrocarbon therethrough and wherein the average molecule of the polymer is of sufficiently large physical size to effect a substantial reduction of the formation rock permeability and wherein the physical size of the molecule is reduced when contacted with an aqueous solution containing large concentrations of Ca^{++} and/or Mg^{++}, the improved process comprising increasing the total hardness of the water within the polymer solution to reduce the physical size of the polymer molecules, the result being to cause less permeability reduction of the formation rock as the polymer solution is displaced toward the production well and to permit higher injection rates.

3,888,310
PROCESS FOR INHIBITING SCALE DEPOSITION

Vernon H. Schievelbein, and Thomas E. Sample, Jr., both of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Division of Ser. No. 250,183, May 4, 1972, Pat. No. 3,849,328.
This application June 24, 1974, Ser. No. 482,282
Int. Cl. E21b *43/00;* C02b *5/06*
U.S. Cl. 166—279 7 Claims

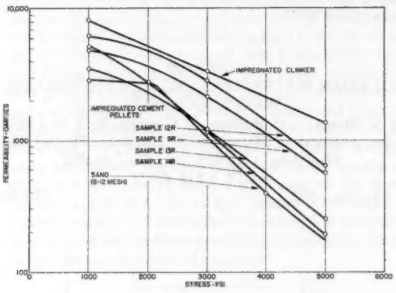
1. A method for inhibiting the formation of mineral scale upon surfaces in contact with scale prone waters, the surfaces including a well casing and related surface and subsurface equipment for a well drilled to and in fluid communication with a subterranean formation wherein the well and related equipment is used to inject the scale prone waters into the subterranean formation comprising

dissolving sulfonated alkali lignins in the scale prone waters before the aqueous solution contacts the well casing and related equipment.

3,888,311
HYDRAULIC FRACTURING METHOD

Claude E. Cooke, Jr., Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Filed Oct. 1, 1973, Ser. No. 402,538
Int. Cl. E21b *43/26*
U.S. Cl. 166—280 21 Claims



1. In a hydraulic fracturing method wherein a fluid is injected into a subterranean formation to open a fracture therein, the improvement comprising propping said fracture with hydraulic cement or clinker pellets impregnated with an effective amount of a resin to reduce pellet fragmentation.

3,888,312
METHOD AND COMPOSITIONS FOR FRACTURING WELL FORMATIONS

Robert L. Tiner; Marlin D. Holtmyer, both of Duncan; Bobby J. King, and Richard A. Gatlin, both of Marlow, all of Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Apr. 29, 1974, Ser. No. 465,378
Int. Cl.[2] E21B *43/26*
U.S. Cl. 166—308 29 Claims

1. A process for fracturing a subterranean formation which comprises

introducing into said formation a crosslinked gel at a flow rate and pressure sufficient to produce a fracture in said formation;

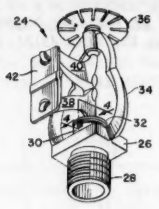
wherein said crosslinked gel is comprised of an aqueous liquid, a gelling agent selected from solvatable polysaccharides having molecular weights of at least about 100,000, and a crosslinking compound selected from organotitanates having titanium in the +4 oxidation state.

3,888,313
DISCHARGE HEAD AND FIRE PROTECTION SYSTEM UTILIZING SAID HEAD

Carvie Thomas Freeman, Norcross, Ga., assignor to Factory Mutual Research Corporation, Norwood, Mass.

Filed Oct. 8, 1974, Ser. No. 513,142
Int. Cl.[2] A62C *37/12*
U.S. Cl. 169—16 12 Claims

1. A discharge head for use in a fire protection system comprising a body member for containing pressurized extinguishant, said body member having an inlet for connecting to a source of said extinguishant and an outlet for discharging said extinguishant, closure means for said outlet, linkage means for applying a force against said closure means greater than, and in an opposite direction to, the force of said pressurized extinguishant against said closure means to retain said closure means in an operative position relative to said outlet where it prevents the discharge of fluid from said outlet, said linkage means adapted to respond to a predetermined fire condition in its vicinity for releasing its force, at least one shear pin connecting said closure means to said body member in said operative position, said shear pin adapted to break and release said closure means in response to the pressure of said extinguishant exceeding a predetermined value, said closure

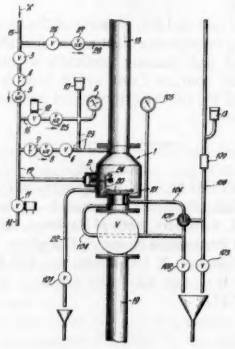


means being forced from said operative position by said extinguishant upon the existence of said fire condition and said predetermined extinguishant pressure to permit the discharge of said extinguishant from said outlet.

3,888,314
SPRINKLER SYSTEM

Ernst Landsberg, Bergisch-Gladbach, Germany, assignor to Walther & Cie Aktiengesellschaft, Koln-Dellbrueck, Germany

Filed Nov. 9, 1973, Ser. No. 414,539
Claims priority, application Germany, Nov. 11, 1972, 2255369
Int. Cl. A62c *35/22*
U.S. Cl. 169—20 4 Claims

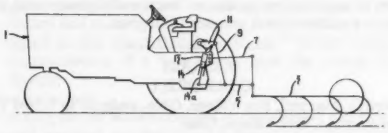


1. In a sprinkler system, a combination comprising a sprinkler conduit; a water supply conduit; a diaphragm valve interposed between said sprinkler conduit and said water supply conduit; a pressure conduit communicating with a source of pressurized gas and with said diaphragm valve for normally maintaining the latter closed by the pressure of said gas; a bypass conduit having one end portion communicating with said pressure conduit intermediate said source and said diaphragm valve, and another end portion communicating with said sprinkler conduit; a control valve interposed in said bypass conduit; a venting valve interposed in said pressure conduit; and a permanently energized fire alarm circuit connected with said control valve and said venting valve and normally maintaining both of them closed, said circuit being operative for opening said venting valve when detecting a fire, and for opening said control valve in automatic response to said circuit becoming inoperative.

3,888,315
DRAFT SENSING APPARATUS FOR TRACTOR

Lee E. Elfes, Bloomfield Hills, and Otto Mueller, Jr., Detroit, both of Mich., assignors to Massey-Ferguson Inc., Detroit, Mich.

Filed Oct. 29, 1973, Ser. No. 410,926
Int. Cl. A01b *63/112*
U.S. Cl. 172—7 5 Claims

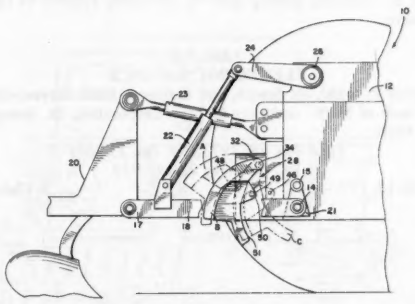


1. A tractor draft sensing apparatus having an elongated load measuring shaft mounted on spaced supports, draft means connected to the shaft at points spaced from the supports whereupon forces on said draft means causes the shaft to bend, sensing means for measuring deflection of the shaft including an elongated member attached at its first end to the shaft, means for measuring relative movement of the shaft and the other end of the member and means for limiting relative movement between said shaft and other end of the elongated member in one plane so that only relative movement between said shaft and the other end of the elongated member in a second plane is measured.

3,888,316
TRACTOR HITCH SWAY LIMITING DEVICE

Joseph A. Azzarello, Palos Heights, and Fosco L. Di Vita, Chicago, both of Ill., assignors to International Harvester Company, Chicago, Ill.

Filed Feb. 4, 1974, Ser. No. 439,514
Int. Cl. A01b *59/043*
U.S. Cl. 172—450 5 Claims



1. In a tractor having a hitch assembly including draft links laterally spaced and pivotally mounted at one end to the tractor for lateral and vertical movement relative thereto, the improvement comprising:

a pair of cam means pivotally carried by said tractor adjacent said draft links;

each of said cam means having a sway surface, a lock surface and a ramp surface, said sway and lock surfaces being arcs located in planes which are generally parallel and spaced apart;

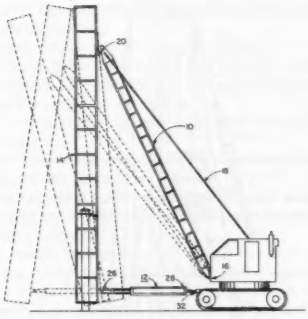
blocking means secured to each of said draft links and having a cam follower capable of abutting engagement with one of said surfaces;

said cam means being capable of being selectively pivoted to and retained in a first locking position wherein said cam followers engage said locking surfaces over the entire range of vertical movement for said draft links, a second limited sway position wherein said cam followers engage said sway surfaces when said draft links are lowered and sequentially engage said ramp surfaces and said locking surfaces as said draft links are raised and a third free-sway position wherein said cam followers are free from any contact with said cam means when the draft links are in a lower position.

3,888,317
HYDRAULIC PILE DRIVER

John E. Walters, Casson Ln., West Paterson, N.J. 07424

Filed Mar. 27, 1974, Ser. No. 455,287
Int. Cl.[2] E02D *7/14*
U.S. Cl. 173—43 5 Claims



1. A powered pile driver assembly for use in conjunction with a crane having a boom which is rotatable through 360° and vertically adjustable, said assembly comprising:

a partial universal joint mounted at the free upper end of said boom for pivotal movement about a generally horizontal axis;

an extensible spotter mounted on said crane adjacent the base of said boom for pivotal movement about a generally horizontal axis and a generally vertical axis, mounting means comprising a universal joint;

said extensible spotter comprising a pair of elongated rectangular frames, one frame being telescopically arranged within the other;

a lead frame;

a universal joint mounted near the lower end of said lead frame;

a partial universal joint mounted near the uper end of said lead frame for pivotal movement about a generally vertical axis;

said lead frame being mounted at its lower end to said extensible spotter by said universal joint;

said lead frame being mounted at its lower end to said extensible spotter by said universal joint;

said lead frame being mounted near its upper end by said partial universal joints which together form a full universal joint;

hydraulic means for extending and retracting said spotter including:

a hydraulic cylinder mounted at each end of said spotter and having a piston slidably mounted therein;

an inlet valve for supplying hydraulic pressure to said cylinder;

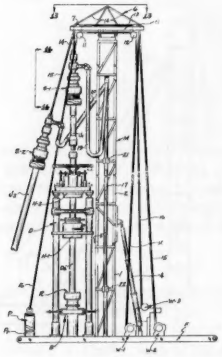
an outlet valve for relieving said hydraulic pressure;

a source of hydraulic pressure;

hoses to connect said inlet valve and said outlet valve to said source of hydraulic pressure;

a control manifold with an operating valve to control said hydraulic pressure;
hydraulic means for moving said spotter about a generally vertical axis relative to said crane body;
hydraulic means for moving said lead frame about a generally vertical axis relative to said spotter.

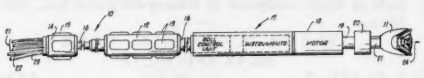
3,888,318
WELL DRILLING APPARATUS
Cicero C. Brown, P.O. Box 19236, Houston, Tex. 77024
Continuation-in-part of Ser. No. 181,067, Sept. 16, 1971, Pat. No. 3,722,603. This application Aug. 24, 1972, Ser. No. 283,334
Int. Cl. E21b *19/08*
U.S. Cl. 173—149 8 Claims



1. A portable well drilling unit comprising:
a. support means;
b. snubber means mounted on said support means having a fixed head, selectively engageable with a drill string for support thereof, and a rotating head, selectively and non-threadedly engageable with said drill string and reciprocally movable relative to said fixed head power means operatively connected to said rotating head for simultaneous driving rotation and reciprocation of a drill string during drilling operations, said rotating head surrounding upper joints of said drill string and being reciprocal thereon when not in engagement therewith so as to permit the upper portion of said drill string to extend through and vertically above said rotating head;
c. mast means mounted on said support means;
d. non driven swivel means suspended by cable means from said mast means for handling pipe joints to be added to or taken from said drill string and for supporting the upper end of the last joint of said drill string in a non-driving relationship during said drilling operations; and
e. power means connected to said cable means for reciprocation of said swivel means.

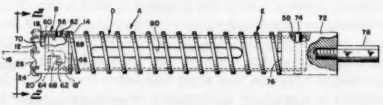
3,888,319
CONTROL SYSTEM FOR A DRILLING APPARATUS
Henry A. Bourne, Jr., Ponca City, Okla., and Rondon L. Schroeder, Shinnston, W. Va., assignors to Continental Oil Company, Ponca City, Okla.
Filed Nov. 26, 1973, Ser. No. 419,157
Int. Cl. E21b *7/08*, *3/08*
U.S. Cl. 175—76 15 Claims

9. A roll control device for a drilling apparatus having a pressure mechanism and a drill means comprising a fractional-rotation torque motor attached to said pressure mechanism and having its output connected through a drive means and an antitorque means to said drill means, and means for applying



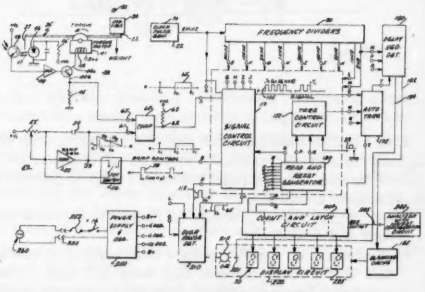
power to said torque motor to fractionally rotate said drill means a predetermined number of degrees.

3,888,320
CORE DRILL
Richard D. Maxwell, Bay Village, Ohio, assignor to Tri-M Tool Corporation, Bay Village, Ohio
Continuation-in-part of Ser. No. 379,184, July 13, 1973, abandoned. This application Feb. 19, 1974, Ser. No. 443,409
Int. Cl. E21b *9/16*, *17/046*; E21c *13/02*
U.S. Cl. 175—394 6 Claims



5. A core drill bit comprising; a hollow cylindrical member having a cutting end and an opposite end portion, an elongated hollow cylindrical drill sleeve having a bit mounting end portion receivable in said opposite end portion of said bit, releasable attaching means of a non-threaded type on said opposite end portion for releasably attaching such bit to said drill sleeve and cooperating releasable attaching means on said bit mounting end portion for cooperation with said releasable attaching means on said bit, said sleeve having an opposite driving end portion including an abutment, and further including a coil spring surrounding said sleeve and having opposite spring ends bearing against said abutment and said bit for normally biasing said bit outwardly relative to said sleeve.

3,888,321
ELECTRONIC BALANCE
Leroy E. Wilki, St. Joseph, and George J. Sitek, Stevensville, both of Mich., assignors to Leco Corporation, St. Joseph, Mich.
Filed Feb. 16, 1973, Ser. No. 333,049
Int. Cl. G01g *23/14*, *3/14*
U.S. Cl. 177—165 5 Claims



1. An electronic balance comprising:
circuit means for providing a plurality of electrical pulses, the total number of which represents the weight of objects positioned on the balance;
storage means coupled to said circuit means and selectively operated by a tare switch to store signals representing the

unknown weight of an object positioned on the balance; comparator means coupled to said circuit means and to said storage means for comparing signals stored in said storage means and signals representing the weight of said object and an additional object positioned on the balance and for providing a control signal when the number of pulses from said circuit means exceeds the stored number of pulses thereby indicating that an additional object is positioned on the balance;

negative weight detector means coupled to said circuit means and to said storage means for providing an output signal in the event signals from said circuit means are representative of a weight less than the stored weight signals;

display means;

blanking circuit means coupled to said display means and to said negative weight detector means and responsive to said output signals therefrom to blank said display means when the weight positioned on said balance is less than the weight represented by signals stored in said storage means; and

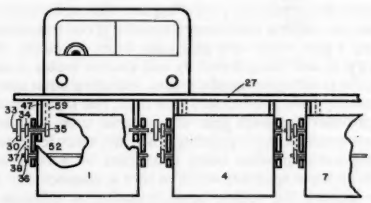
selectively operated coupling means coupled to said circuit means, to said display means and to said comparator means and responsive to said control signal from said comparator means for applying the pulses from said circuit means representing the weight of the additional object to said means to actuate said display means to provide an indication of the weight of the additional object.

3,888,322

WHEELED BELLYLESS VEHICLE

Paul Kehler, South Bend, Ind., assignor to Applied Inventions Corporation, North Tonawanda, N.Y.

Filed Nov. 29, 1973, Ser. No. 420,285
Int. Cl. B62d *11/02*
U.S. Cl. 180—6.2 **2 Claims**



1. A vehicle comprising a main body,

a multiplicity of powered wheels that cover substantially the whole underside of said vehicle and that are operably connected into two outer rows of wheels that extend along the two sides of said vehicle and one or more inner rows of wheels that are positioned between said outer rows of wheels,

drive means for individually driving said outer rows of wheels and said inner rows of wheels,

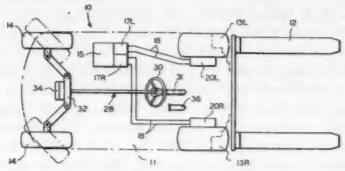
and control means for transmitting power to said drive means and for selectively causing said outer rows of wheels to rotate in the same or in opposite directions at the same or at different speeds and (causing) said inner rows of wheels to rotate at a speed that is intermediate the speeds of its two adjacent rows of wheels when said outer rows of wheels are driven at different speeds.

3,888,323

HYDRASTATIC CONTROL FOR PIVOT STEERING

Jon Richard Patton, and Ronald Loren Sisson, both of Jackson, Mich., assignors to Clark Equipment Company, Buchanan, Mich.

Filed Jan. 24, 1973, Ser. No. 326,440
Int. Cl. B62d *11/04*
U.S. Cl. 180—6.3 **17 Claims**



1. In a pivot steering vehicle, the combination comprising,

a pair of driving wheels,

a hydrostatic motor for driving each wheel,

a variable pump for each motor and having a control element movable for adjusting the pump and thereby controlling the speed of the motor,

a hydrostatic actuator individual to each control element for moving it,

means for developing pressure and transmitting fluid under pressure to the actuators,

a steering regulator valve individual to each actuator for controlling the transmission of fluid under pressure to the respective actuator,

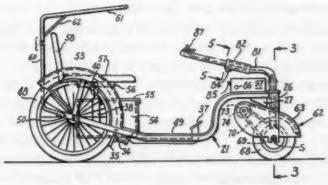
common means for steering the vehicle in either direction including a single steering member, and common means responsive to actuation of the steering member operative for controlling the steering regulator valves and simultaneously moving them and thereby simultaneously moving the actuators for relatively increasing the speed of the outside wheel and decreasing the speed of the inside wheel relative to a predetermined speed of each wheel, in the direction of steering.

3,888,324

ELECTRIC VEHICLE

Robert G. Kossow, 4941 62nd St., Sacramento, Calif. 95820

Filed Jan. 30, 1970, Ser. No. 7,072
Int. Cl. B62d *61/00*; B60k *17/30*
U.S. Cl. 180—21 **1 Claim**



1. An electric vehicle comprising a generally horizontal frame, a pair of wheels journalled in the rear end of said frame in spaced apart parallel relation, a seat secured to said frame, a battery box secured to said frame and underlying said seat, a vertical bushing secured to the forward end of said frame, a driving and steering unit positioned under and supporting the forward end of said frame, a neck secured to said driving and steering unit and journallled in said bushing for rotation about a vertical axis, a tiller bar secured to said neck and extending rearwardly therefrom for rotating said neck and said driving and steering unit to steer said vehicle, said driving and steering unit including a housing rigidly secured to said neck and turning therewith, said housing including a pair of spaced

parallel opposite side walls and an upper wall connecting said side walls, a pair of spaced apart front wheels in said housing and projecting therebelow, said front wheels being respectively adjacent said side walls of said housing, a shaft mounted transversely in said housing, said shaft having threaded opposite ends and said side walls of said housing having generally U-shaped slots formed therein with the threaded ends of said shaft projecting through said slots, a nut threaded on each end of said shaft releasably securing said shaft to said housing, a tubular shaft journalled on said shaft with said front wheels secured to said tubular shaft to revolve therewith, an electric motor secured in and enclosed by said housing a chain sprocket on said motor, a chain sprocket on said tubular shaft, a chain trained over said chain sprockets to rotate said tubular shaft and said front wheels, brake means in said housing for restraining rotation of said front wheels, control means for said electric motor on said tiller bar, and control means for said brake means mounted on said tiller bar for controlling said electric vehicle.

3,888,325

MOTOR-DRIVEN VEHICLE WITH HYBRID INTERNAL COMBUSTION AND ELECTRICAL DRIVE

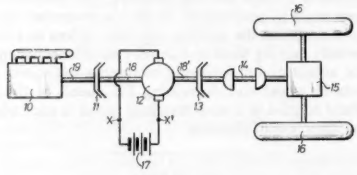
Hans Reinbeck, Stuttgart, Germany, assignor to Robert Bosch G.m.b.H., Gerlingen-Schillerhohe, Germany

Continuation of Ser. No. 256,102, May 23, 1972, abandoned. This application Feb. 20, 1974, Ser. No. 444,121

Claims priority, application Germany, July 6, 1971, 2133485

Int. Cl. B60k *1/00*

U.S. Cl. 180—65 A **7 Claims**



1. Motor driven conveyance comprising

an internal combustion engine (**10**) having a power output rating in excess of that required to operate the conveyance and having an output shaft (**19**) forming one end of a power train for the conveyance;

at least one driven wheel (**16**); at least one driven wheel axle and a drive shaft connected to said axle (**14, 15**) forming one end of the power drive train;

a dynamo electric machine (**12**) of sufficient power to operate the conveyance, operable in generator mode or in motor mode, and having a double-ended shaft (**18, 18'**), one end (**18'**) being directed towards said drive shaft and the other end (**18**) being directed towards the internal combustion engine shaft (**19**), said dynamo electric machine forming an intermediate portion of the power drive train;

secondary battery means (**17**) carried on the conveyance to store power from, and supply power to the dynamo electric machine;

means (**13**) to selectively and positively either connect, or disconnect, without slip, one end (**18**) of the dynamo electric machine shaft to the drive shaft and hence directly to the wheel only when the motor conveyance is stopped to place the dynamo electric machine in fixed direct wheel driving connection in the drive train;

means (**11**) to gradually connect the other end (**18**) of the shaft of said dynamo electric machine to said internal combustion engine (**10**), independently of relative motion, or speeds of the shaft (**19**) of the internal combustion engine (**10**) and said other end (**18**) of the shaft of the dynamo electric machine (**12**);

said gradual connection means (**11**) being independent of said positive connection means (**13**) to permit connection of said positive connection means and hence positive drive connection from the dynamo electric machine (**12**) directly to the wheel upon energization of the dynamo electric machine (**12**) and moving of the conveyance with the internal combustion engine (**10**) stopped, and then gradual connection of the internal combustion engine and hence starting of the internal combustion engine during such motion of the vehicle and during operation of the dynamo electric machine.

3,888,326

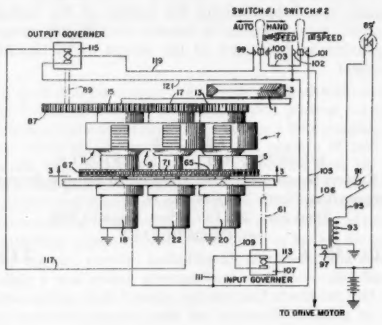
AUTOMATIC OR MANUAL MULTI-SPEED TRANSMISSION FOR ELECTRICALLY PROPELLED VEHICLES

Gordon W. Osborne, 180 Raeburn Ave., Rochester, N.Y. 14619

Filed Mar. 19, 1974, Ser. No. 452,636

Int. Cl. B60k *17/12*

U.S. Cl. 180—65 R **15 Claims**



1. An electrically propelled vehicle, including in combination, an electric motor for propelling the vehicle, batteries for powering the electric motor and a variable speed transmission including a gear train, said gear train being an output shaft connected to and being driven by said electric motor to drive the vehicle at different speeds, means, including input sprockets releasably connected to said gear train, one input sprocket being provided for each gear of said gear train, said input sprockets continuously operating when the electric motor is operating each sprocket being connected by a continuous chain to an input sprocket which in turn is connected to said electric motors, the vehicle being propelled at different selected speeds by said gear train while the speed of the electric motor remains constant, a plurality of separate means, to releasably connect each input sprocket with its respective gear of said gear train, controlling means to render any selected separate means operable to cause operative connection of an input sprocket to a gear to cause actuation of said gear while deactuating the other separate means to disconnect the remaining gears of said gear train from the remaining input sprockets so that said remaining gears will be rotated by the gear connected to said selected separate means.

3,888,327

VEHICLE RADIATOR PROTECTION DEVICE

Vernon N. Reece, Rt. 3, Box 443-C, De Queen, Ark. 71832

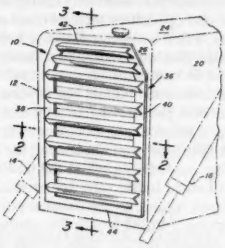
Filed Jan. 30, 1974, Ser. No. 427,689

Int. Cl. B60k *11/04*

U.S. Cl. 180—68 P **7 Claims**

1. A vehicle radiator protection device for protecting a vehicle radiator from protruding objects through the radiator

air opening while freely allowing air to pass through, said device comprising a plurality of spaced, elongated deflector bars secured across the outer surface of the air opening, the outer surface of each said deflector bar being convex in cross sectional shape and a plurality of spaced elongated stopping



bars secured across the inside surface of the air opening between said deflector bars and the vehicle radiator, one said stopping bar being positioned in substantial alignment with each space between adjacent deflector bars, the outer surface of each said stopping bar being concave in cross sectional shape.

3,888,328

ARRANGEMENT FOR COMPENSATING YAWING MOMENTS

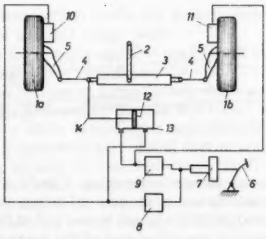
Heinz Leiber, Leimen, Germany, assignor to Teldix GmbH, Heidelberg, Germany

Filed Mar. 15, 1973, Ser. No. 341,471

Claims priority, application Germany, Mar. 15, 1972, 2212328

Int. Cl.[2] B62D *5/06*

U.S. Cl. 180—79.2 R **5 Claims**



1. An arrangement for compensating for yawing moments generated as a result of different braking forces acting on the steered wheels of a vehicle steered by a steering mechanism, comprising in combination:

a. an antilock device connected to the brake of each steered wheel for separately varying the braking pressure in the associated wheel as a function of the locking tendency thereof;

b. signal generating means connected to the brakes of said steered wheels for obtaining separate signals dependent upon the braking pressures in the brakes of said steered wheels;

c. comparator means connected to said signal generating means for comparing the signals characterizing the braking pressures in the brakes of the different steered wheels and for emitting a setting signal as a function of the difference in said braking pressures; and

d. a setting mechanism connected to said comparator means for receiving said setting signal; said setting mechanism being further connected to said steering mechanism for applying a moment thereto as a function of said setting signal for countering the effect of the yawing moment generated by said difference in said braking pressures.

3,888,329

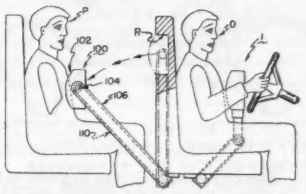
VEHICLE SAFETY DEVICE

James Monaghan, 11849 Clifton Blvd., Apt. 204A, Lakewood, Ohio 44107

Continuation-in-part of Ser. No. 250,413, May 4, 1972, Pat. No. 3,759,343, which is a continuation-in-part of Ser. No. 163,379, July 16, 1971, Pat. No. 3,741,330, said Ser. No. 250,413, is a continuation-in-part of Ser. No. 163,379,. This application May 14, 1973, Ser. No. 360,345

Int. Cl. B60r *21/08*

U.S. Cl. 180—103 **19 Claims**



1. A resuable vehicle safety device adapted for restraining a vehicle occupant comprising,

a resilient restraint pad,

a transversely extending crossmember for supporting said pad,

a rotatable support arm having one end operably connected to said crossmember,

a transversely extending pivot shaft,

said support arm having its opposite end pivotally connected to said pivot shaft for rotation of said support arm in a vertical longitudinal plane for moving said crossmember and said pad from a prepared storage position in front of and spaced from said occupant to a restraint position in contact with the torso of said occupant,

orientation maintenance means connected to said pivot shaft and said crossmember to control rotation of said crossmember about its transversely extending axis and resulting in an angular rotation of said crossmember with respect to said support arm which is substantially equal and opposite to the angular rotation of said support arm about said pivot shaft for substantially preserving a predetermined orientation of said pad with respect to said occupant as said support arm is moved in said vertical longitudinal plane,

manual means operably connected to said support arm for moving said support arm and said pad through said vertical longitudinal plane to a closer prepared position in closer proximity to the occupant's torso than when in said prepared storage position,

a manually-operated clutch means releasably locking said support arm in said closer prepared position,

sensing means for sensing a vehicle accident event when said restraining pad is in said prepared positions,

power means connected to said support arm for moving said support arm and said restraint pad from said prepared positions into contacting engagement with said occupant, said power means including actuation means operably connected to said sensing means for actuating said power means upon the sensing of an accident event by said sensing means, and

said clutch means including release means to enable said support arm to be rotated in a direction toward said occupant from said closer prepared position and preventing movement away from said occupant from said closer prepared position so that said restraint pad may be moved by said power means into contact with said occupant

upon the sensing of an accident event by said sensing means while generally maintaining said predetermined orientation.

3,888,330

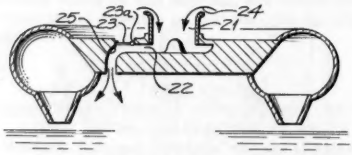
MEANS AND METHOD OF CONTROLLING FLUID CUSHION VEHICLES

Wilfred J. Eggington, Claremont, and Owen Douglas, Fair Oaks, both of Calif., assignors to Aerjet-General Corporation, El Monte, Calif.

Continuation of Ser. No. 63,487, Aug. 13, 1970, abandoned. This application Feb. 21, 1973, Ser. No. 334,791

Int. Cl. B60v *1/16*

U.S. Cl. 180—121 **12 Claims**



1. In a cushion cell vehicle adapted to travel or hover over terrain, said vehicle being of the type having a plurality of cushion cells, formed by downwardly distending skirts of flexible material which are open at the bottom, said cells being arranged around the periphery of the vehicle to form a central space bounded by the peripheral cells below the vehicle to provide a central fluid cushion, and wherein said cushion cells have in planform a lower edge and an upper edge which circumscribes a greater area than circumscribed by the lower edge, and having means for introducing pressurized fluid into the cells which leaves at their bottom openings to raise the pressure in the central cushion space as well as at the cells and exert lift to the vehicle, a system for operating at a selected partial hover height comprising means for controllably releasing fluid from the central cushion to the atmosphere to bring said pressurized peripheral cushion cells into constrictive contact with the terrain and the planform of said cushion cells lower edges become progressively larger as the cells become increasingly constricted, to the extent that the lift exerted by the constricted cushion cells is substantially equal to the vehicle weight, and said vehicle is stable in the rolling and pitching planes and in vertical translation while operating at said selected partial hover height.

3,888,331

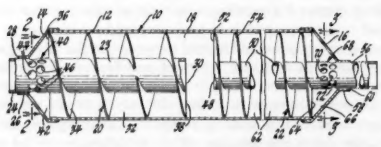
POWER TUNED WAVE INTERFERENCE SILENCER

Wei-Ming Wang, Grand Blanc, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed May 3, 1974, Ser. No. 466,526

Int. Cl. F01n *1/00*

U.S. Cl. 181—44 **4 Claims**



1. A silencer assembly for muffling noise and scavenging exhaust from an exhaust port of an engine comprising: an outer casing having an inlet end and an outlet end; a first open ended tube having one end located outside said casing and the other end thereof interiorly of said outer casing at the inlet end thereof to define a first outer flow path between said outer casing and said first tube, a second open ended tube having one end located outside said casing and the other end thereof directed interiorly of said outer casing at the outlet end thereof to define a second outer flow path between said outer casing and said second tube, said first and second tubes being located coaxially of one another and having open ends thereon located opposite one another in spaced relationship with respect to one another, said outer casing defining an open volume between said oppositely located open ends of said first and second tubes, a first wave interference helical baffle vane located within said first outer flow path having an inlet end and an outlet end in communication with said open volume, a second wave interference helical baffle vane located within said second outer flow path having an inlet end in communication with said open volume and an outlet end, means forming openings in said first tube communicating the interior of said tube with said first outer flow path at the inlet end of the first turn of said first helical baffle vane for producing a reflected wave from the open volume to the exhaust port of the engine, said first tube having a tuned length for producing a negative pressure at the exhaust port to reduce back pressure and to improve volumetric efficiency of the engine, said first interference helical baffle vane and said openings further serving to produce an interference wave for attenuating a first range of sound waves in said engine exhaust, said second tube having openings therein within said outer case in communication with the second outer flow path at the outlet end of said helical baffle vane to produce an interference wave to attenuate a second range of sound frequencies within said exhaust.

3,888,332

EXHAUST SILENCERS

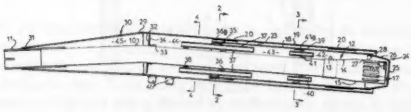
Geoffrey Ernest Roe, Bramhall, and John Edward Favill, Dudley, both of England, assignors to Norton Villiers Limited, Staffordshire, England

Filed Oct. 29, 1973, Ser. No. 410,409

Claims priority, application United Kingdom, Apr. 18, 1973, 18675/73

Int. Cl. F01n *1/08*

U.S. Cl. 181—53 **4 Claims**



1. An exhaust silencer comprising: a body which includes inner, intermediate and outer co-axial tubes; an exhaust gas inlet at one end of the body and in one end of the inner tube; an exit opening at the other end of the inner tube which is imperforate between its one end and the exit opening; an outlet at the other end of the body in the form of a slot; an outlet passage defined between concentric inner and outer walls provided by the intermediate and outer tubes respectively and being located immediately upstream of said slot in the general direction of flow of the exhaust gas, the outlet passage having an entrance at one end and terminating in the slot at the other end and being arranged so that all the exhaust gas flows therethrough; said concentric walls of the passage being imperforate and spaced apart by a constant distance over the whole of the overlapping lengths of the intermediate and outer tubes; said distance being such that the height of the passage between the walls is such as to cause attentuation of the noise of gas flowing through the outlet passage while the area of the slot and of the cross-section of the outlet passage transverse to the general direction of flow of the gas therethrough is at least as great as the cross-sectional area of the inlet transverse to the general direction of flow of exhaust gases through the inlet; the outlet passage having a length between the entrance and the slot equal to at least 50 times the height of the slot and providing a clear path for gas flow

in a direction parallel to the longitudinal axis of the passage between the entrance and the slot; there being no part of the flow path of the gas between the inlet and the outlet which has a cross-sectional area transverse to the general direction of gas flow which is less than said cross-sectional area of the inlet; there being one or more chambers through which the gas flows on emerging from the exit opening of the inner tube and arranged so that the direction of flow of exhaust gases through the chamber or chambers is in a direction generally opposite to the direction of flow of exhaust gases through the inner tube and the passage, and there being a further chamber defined between the inner and outer tubes into which the gas flows on emerging from said first mentioned chamber or chambers, the general direction of flow of gas being reversed in said further chamber from the entrance to which the gas passes directly to the entrance to the outlet passage.

3,888,333

TREMOLO GENERATING DEVICE WITH MULTI-DIRECTIONALLY ROTATING SPEAKER

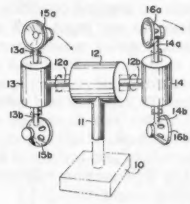
Kiminori Yamaguchi, Hamamatsu, Japan, assignor to Nippon Gakki Seiko Kabushiki Kaisha, Japan

Filed Apr. 11, 1973, Ser. No. 350,035

Claims priority, application Japan, Apr. 20, 1972, 47-39885; May 19, 1972, 47-58766; June 8, 1972, 47-67830

Int. Cl. H04r *1/20, 1/28*

U.S. Cl. 181—143 **9 Claims**



1. A sound effect producing device comprising:

at least one first rotary shaft,

means for rotating said first rotary shaft about its longitudinal axis,

an even number of second rotary shafts positioned symmetrically with respect to said first rotary shaft, said second rotary shafts extending at approximately right angles to the longitudinal axis of said first rotary shaft,

means secured to said first rotary shaft for rotating said second rotary shafts about their longitudinal axes, and

at least one sound radiating member mounted on each of said second rotary shafts and being rotatable therewith, said sound radiating members radiating sound waves in a direction making an approximate right angle to said second rotary shafts.

3,888,334

BICYCLE PEDAL-ACTUATED BRAKE AND FREEWHEEL SYSTEM

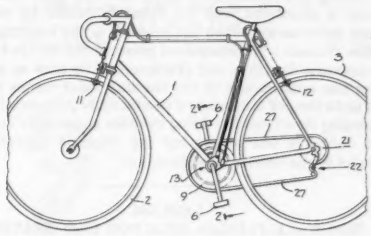
Richard B. Mack, 21 Westwood Rd., Woodbridge, Conn. 06525

Filed June 27, 1974, Ser. No. 483,523

Int. Cl. B62l *1/06*

U.S. Cl. 188—24 **5 Claims**

1. A bicycle comprising a frame, front and rear wheels supporting said frame, a crank-arm axle rotatively mounted by said frame, a drive sprocket connected with said axle, a driven sprocket connected with said rear wheel, a sprocket chain interconnecting said sprockets, a caliper brake for at least said rear wheel, and means for applying said brake by reverse rotation of said axle and releasing the brake by forward rotation of the axle; wherein the improvement comprises means for connecting said driven sprocket with said rear wheel so that the rear wheel can freewheel relative to the driven sprocket and the driven sprocket substantially cannot rotate forwardly when the rear wheel is held against rotation by said



brake, and means for connecting said drive sprocket with said axle with a lost-motion action permitting limited relative rotation of said axle and said drive sprocket.

3,888,335

HYDRODYNAMIC RETARDER FOR VEHICLES, ESPECIALLY FOR MOTOR VEHICLES

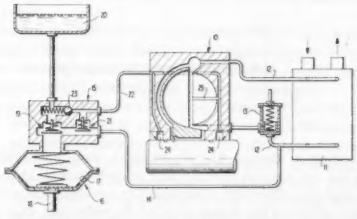
Hans Hanke, Stuttgart, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

Filed Dec. 7, 1973, Ser. No. 422,651

Claims priority, application Germany, Dec. 8, 1972, 2260141

Int. Cl. F16d *57/02*

U.S. Cl. 188—290 **22 Claims**



1. A hydrodynamic retarder for vehicles which includes an internal working circulatory system between at least one rotating blade wheel means and at least one stationary blade wheel means in a working space, an external cooling circulatory system, a by-pass valve in the external cooling circulatory system actuatable by the pressure thereof, a filling cylinder means operatively connected with the external cooling circulatory system by way of a filling and discharge line means, said filling cylinder means being selectively controlled by control valve means, a reservoir means operatively coordinated to the external cooling circulatory system, and pressure-relief means of the spaces disposed directly in front of shaft seals in the direction toward a place of the working circulatory system which is pressureless during operation, characterized in that a first spring-loaded disk valve means is operatively associated with the filling cylinder means, said first valve means being operable to close during a braking operation a connection between the filling and discharge line means and the reservoir means while opening a connection between the filling and discharge line means to the filling cylinder means, and said valve means being additionally operable to open the connection between the filling cylinder means, the reservoir means and the filling and discharge line means during idling operation, and in that additionally a lubricating line means is provided between the pressure relieved spaces at the seals and the filling and discharge line means, a second spring-loaded disk

valve means being operatively connected in said lubricating line means, said second valve means being operable to close during a braking operation but opening up during idling operation the connection between the lubricating line means and the filling and discharge line means, the lulbricating line means is connected with the reservoir means by way of a check valve means, when the pressure in the lubricating line means exceeds a predetermined pressure but always closes in the opposite direction, and characterized by such an arrangement and construction of the two disk valve means that the two disks thereof are disposed substantially transversely to the impinging flow from the filling cylinder means into the filling and discharge line means but are disposed approximately parallel to the reverse flow direction.

3,888,336

SIDEWALK PLUG-IN POLE FOR CAR HEATERS, WARMERS AND THE LIKE

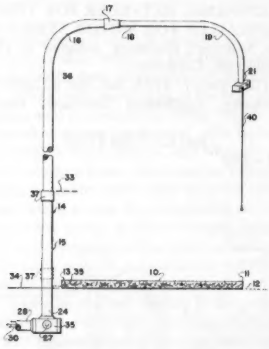
James Zajic, Box 176, Wainwright, Alberta, Canada

Filed Apr. 5, 1974, Ser. No. 458,115

Claims priority, application Canada, May 3, 1973, 170315

Int. Cl. B60l *9/00*

U.S. Cl. 191—1 R **6 Claims**



1. A plug-in device for supplying a source of electrical energy for car heaters and the like of cars parked at the curb at the edge of a sidewalk; comprising in combination a vertical standard adjacent the inner edge of the sidewalk, but spaced therefrom, an over-spanning portion extending from the upper end of said vertical standard, an electric plug receptacle on the distal end of said over-spanning portion, connectable to a source of electrical energy via said over-spanning portion and said vertical standard, said over-spanning portion being spaced above said sidewalk by at least six feet, and means to anchor said vertical standard within the ground, said means including a pipe tee secured at the base of said vertical standard, and relatively short lengths of pipe extending outwardly at right angles from each side of said tee in a substantially horizontal plane, to stabilize said vertical standard.

3,888,337

REVERSIBLE REDUCTION GEAR SYSTEM AND BRAKE FOR MARINE DRIVE

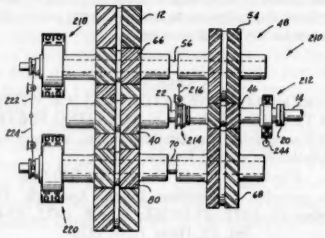
Eugene P. Worthen, deceased, late of Braintree, Mass., and New England Merchant natl. Bank, executor, Braintree, Mass., assignors to United Aircraft Corporation, East Hartford, Conn.

Division of Ser. No. 229,871, Feb. 28, 1972. This application July 5, 1973, Ser. No. 376,846

Int. Cl. B60k *29/02*

U.S. Cl. 192—4 C **8 Claims**

1. Reversible reduction gear apparatus for alternatively coupling an input shaft to an output shaft in a forward drive direction and in a reverse drive direction including in combination, an input shaft, an output shaft, an output gear carried by said output shaft for rotation therewith, a forward drive input gear carried by said input shaft for rotation therewith, a first intermediate shaft, a second intermediate shaft, respective intermediate gears carried by said intermediate shafts for rotation therewith, said intermediate gears meshing with said forward drive input gear, respective forward drive output pinions carried by said intermediate shafts for rotation therewith, said output pinions meshing with said output gear, a reverse drive pinion rotatably carried by said input shaft, a forward positive clutch actuatable between an engaged condition at which it couples said forward drive output pinions to



said input shaft and a disengaged condition, a reverse positive clutch actuatable between an engaged condition at which it couples said reverse pinion to said input shaft and a disengaged condition, mechanical spring means normally biasing said forward clutch to engaged condition and said reverse clutch to disengaged condition, fluid pressure means for actuating said clutches against the action of said spring means to disengage said forward clutch and to engage said reverse clutch, a brake associated with one of said intermediate shafts, and control means for actuating said brake and for supplying fluid under pressure to said fluid pressure means to place said apparatus in a reverse drive condition.

3,888,338

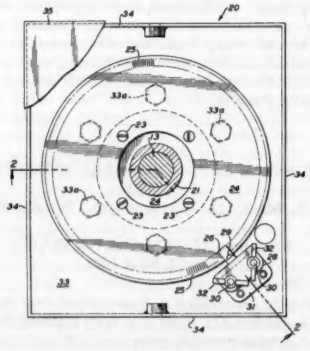
ELECTRONIC INDEXING SYSTEM

William T. Mars, Cuyahoga Falls, Ohio, assignor to McNeil Corporation, Akron, Ohio

Filed Oct. 3, 1973, Ser. No. 402,998

Int. Cl. F16d *13/22*

U.S. Cl. 192—142 **10 Claims**



1. Apparatus for moving a machine element a preselected distance, the machine element being operated by a motor which is successively activated and thereafter stopped by a braking device, comprising indicator means driven by the motor and indicating the amount of movement of the machine

element, electronic means having a preselected setting therein corresponding to the preselected distance of movement of the machine element, said electronic means reading said indicator means and activating the braking device to stop the motor after the preselected setting has been reached, the motor moving the machine element an overtravel distance between the time of the activation of the brake and the stopping of the motor, said electronic means accounting for the overtravel distance by effectively deducting the overtravel distance of the previous activation from the preselected setting so that the machine element is moved the preselected distance on the next successive activation of the motor.

3,888,339

IMPRESSION CONTROL MECHANISM FOR A TYPEWRITER OR SIMILAR MACHINE

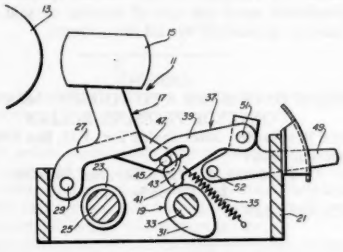
Gerald Nowak, Bienrode, and Herbert Decker, Lauf, both of Germany, assignors to Triumph Werke Nurnberg A. G., Nurnberg, Germany

Continuation of Ser. No. 277,591, Aug. 3, 1972, abandoned. This application Mar. 1, 1974, Ser. No. 447,229

Claims priority, application Germany, Aug. 7, 1971, 2139650

Int. Cl. B41j *1/60*

U.S. Cl. 197—55 **3 Claims**



1. A single element printing machine comprising
a frame,
a platen,
a type carrier having a plurality of type characters formed thereon,
means supporting said type carrier about a pivot axis on said frame whereby said type carrier can be driven from a rest position toward said platen to impact a selected character against said platen,
said support means having a pin thereon spaced from said pivot axis,
a drive cam rotatably mounted on said frame for driving said type carrier support means about its pivot axis,
a control member having one end located between said cam and said pin,
said one end supporting said pin and establishing a rest position of said type carrier support means,
and an operator controlled adjusting member for determining the impact velocity of said type carrier against said platen,
said control member being pivotally supported at its other end on said adjusting member at a point, said point and said pivot axis being on opposite sides of said pin,
said adjusting member being pivotally supported on said frame whereby pivotal movement thereof shifts said control member between said cam and said pin to rock said type carrier support means about its pivot axis to establish a rest position of said type carrier closer to or farther from said platen.

3,888,340

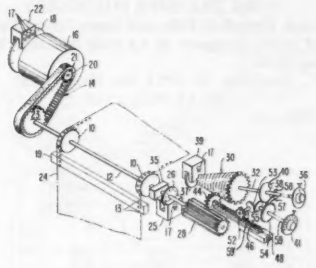
VARIABLE PITCH TAPELESS FORMAT CONTROL SYSTEM FOR LINE PRINTERS

Paul R. Hoffman, Farmington, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed June 1, 1973, Ser. No. 366,122

Int. Cl. B41j *15/00*

U.S. Cl. 197—133 R **25 Claims**



1. A tapeless format control apparatus for selectively advancing web paper in a line printer, said line printer having web paper handling and positioning means associated with a printing position thereof, said apparatus comprising:
a. a stepping motor for operatively advancing said web paper relative to said printing position, said stepping motor being coupled to said web paper handling and positioning means,
b. motor control means associated with said stepping motor and effective fot stopping and detenting said stepping motor,
c. means for selectively determining the length of the web paper upon which lines of information are to be printed, to thereby constitute a selected form length, said web paper length determining means comprising:
a plurality of gears of varying diameters fixed to a rotatable first shaft in coaxial relationship to form a conical gear stack, each of said gears of said stack representing a different form length; an elongated cylindrical gear coupled to said web paper handling and positioning means of said line printer; and adjustable means for coupling said elongated cylindrical gear with a selected one of said plurality of gears forming said conical gear stack, said adjustable coupling means comprising:
a translatably supported toothed rack disposed intemediate and in parallel relationship relative to said elongated cylindrical gear and said conical gear stack; an idling coupling gear rotatably mounted on the innermost extremity of said toothed rack, said coupling gear being engageably disposed relative to said elongated cylindrical gear and individual ones of said plurality of gears forming said conical gear stack; and means responsive to manual manipulation for selectively translating said toothed rack and said coupling gear relative to said elongated cylindrical gear so as to cooperably couple a selected gear of said conical gear stack with said elongated cylindrical gear,
d. means for receiving and storing externally originated print spacing instructions,
e. a plurality of pulse generating means including first pulsing means for identifying each increment of advancement of said web paper, second pulsing means for identifying each increment of rotational motion of said stepping motor, and third pulsing means for identifying the passage of each unit of selected form length, and
f. means cooperating with said motor control means and responsive to said externally originated print spacing instructions for controllably coordinating the pulses gen-

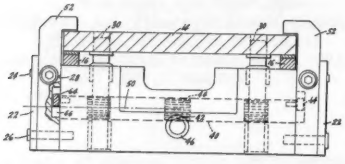
erated by said plurality of pulse generating means such that each line of information printed on said selected form length is properly spaced from the preceding line and all of the lines of printed information conform to a preselected format represented by said externally originated print spacing instructions.

3,888,341

PALLET LOCATING AND CLAMPING APPARATUS FOR WORK TRANSFER MACHINERY

John Konkal, Bloomfield Hills, and James Egbert, Union Lake, both of Mich., assignors to La Salle Machine Tool, Inc., Warren, Mich.

Filed Mar. 26, 1973, Ser. No. 344,757
Int. Cl. B65g *25/00*
U.S. Cl. 198—19 **3 Claims**



1. In work transfer apparatus which includes a work station and a pallet movable into said station, a main frame at said station, at least one movable locator engageable with said pallet in said station to accurately position the pallet, a plurality of spaced apart clamp arms pivotally mounted on said main frame for engagement with said pallet to clamp the same securely in said station, each of said clamp arms being pivotally mounted at one end thereof on said frame and engageable at the other end thereof with said pallet, a spring member extending between said main frame and each of said clamp arms and positioned in direct engagement with said clamp arm intermediate the ends thereof so as to urge said clamp arm toward an engaged position with said pallet, a plurality of support plates corresponding to said clamp arms, each of said support plates being mounted on and spaced from one side of said main frame, pivot means extending between each of said plates and said frame and pivotally supporting one of said arms at a position therebetween, abutment means extending between each of said plates and said frame at a position intermediate the ends of said one clamp arm, one of said spring members extending between said abutment means and one side of said clamp arm so as to urge said clamp arm in one direction, a rotatable actuator shaft, means responsive to rotation of said shaft in one direction for retracting said locator from said pallet and moving said clamp arms against the pressure of said springs to a position disengaged from said pallet, and means responsive to rotation of said shaft in an opposite direction for advancing said locator into engagement with said pallet and releasing said clamp arms for urging by said springs into engagement with said pallet.

3,888,342

DIVERTING ARRANGEMENTS FOR EXAMPLE IN CONVEYING DEVICES

Stephen Geller, Headcorn, England, assignor to Sovex Limited, Erith, England

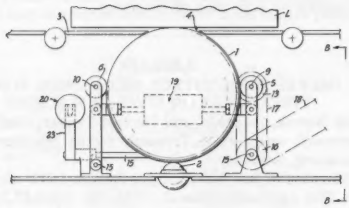
Filed May 24, 1973, Ser. No. 363,779
Claims priority, application United Kingdom, July 7, 1972, 31977/72
Int. Cl. B65g *47/22, 47/82*
U.S. Cl. 198—25 **11 Claims**

1. Conveyor apparatus for selectively diverting articles along a selected one of a plurality of available paths comprising,

conveyor means having a first surface along which the articles are transported and also a second opposite surface,

a spherical member disposed in major part opposite said first surface but having a minor portion thereof which protrudes through an aperture defined in said conveyor means so as to frictionally contact the articles propelled along said conveyor means,

support means for said spherical member permitting its free rotation,



and drive means for said spherical member for rotating said spherical member selectively about at least two different axes,

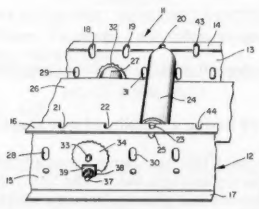
whereby said spherical member selectively diverts the articles along respectively different paths as said articles come into frictional contact with said spherical member dependent upon the axis of rotation of said spherical member as selected by said drive means.

3,888,343

LOCKING DEVICE FOR A POSITIONING MEANS OF A CONVEYOR PRESSURE ROLLER

Bernard Rex Snyder, 3005 Azalea Ter., P.O. Box 698, Norristown, Pa. 19401

Filed Aug. 13, 1973, Ser. No. 388,030
Int. Cl. B65g *13/02*
U.S. Cl. 198—127 R **3 Claims**



1. A locking device to be used with a means for positioning a conveyor pressure roller which is held supported by first and second side plates comprising in combination threaded stud means formed to have a first portion with a relatively large diameter and a second portion with a relatively small diameter, said threaded stud means disposed so that at least a part of said second portion is located in said first side plate so that said first portion is in abutment with said first side plate but protruding externally therefrom away from said second side plate, said stud means further disposed to be in close proximity to said means for positioning a conveyor pressure roller so that said means for positioning a conveyor pressure roller comes to rest on said first portion of said threaded stud means; securing means having a threaded cylindrical aperture therein and having a relatively large flat surface disposed orthogonally to the axis of said threaded aperture, said threaded aperture having threads formed to match the threads of said threaded stud means for being threaded thereon so that said relatively large flat surface can be held firmly against said means for

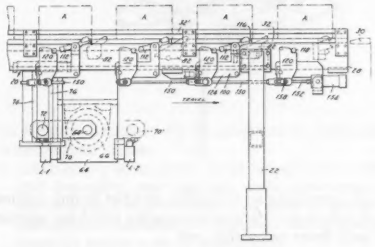
positioning a conveyor pressure roller in response to said securing means being threaded toward said first side plate to come in abutment with said means for positioning a conveyor pressure roller.

3,888,344

ACCUMULATING CONVEYOR WITH ARTICLE POSITION SENSORS AND ARTICLE MOVEMENT SENSORS CONTROLLING THE PUSHER MEMBER

Harry Major, Grosse Pointe Woods, Mich., assignor to Harry Major Machine & Tool Co., Warren, Mich.

Filed Nov. 23, 1973, Ser. No. 418,437
Int. Cl. B65g *25/04*
U.S. Cl. 198—219 **9 Claims**



1. An accumulating conveyor mechanism comprising, in combination:
- a base;
- elongate article support means mounted in stationary relation upon said base and providing a plurality of article supporting stations spaced uniformly apart therealong;
- a transfer carriage mounted for limited reciprocating movement with respect to said support means;
- drive means coupled to said carriage for reciprocating the same;
- a plurality of pusher members movably mounted on said carriage for transferring articles between said stations, each pusher member being biased to an article engaging position and shiftable to a non-engaging position;
- cam means movably engageable with each pusher member for shifting it to said non-engaging position, said cam means including a cam track for engaging said pusher member and further including a counter-weight biasing said track in a direction urging the pusher member to its non-engaging position; an article sensor at each supporting station comprising a movable arm having a first portion normally projecting into the path of an article in a station and a second portion releasably inter-engaging said counter-weight, with said arm being shifted by an article in said station to release said counter-weight and thereby actuate said cam to shift the track in a direction urging the pusher member to its non-engaging position.

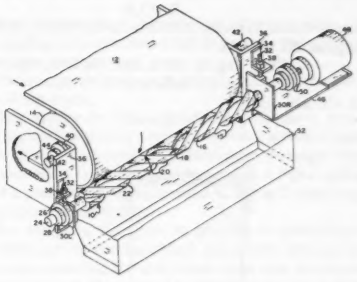
3,888,345

CONVEYOR BELT CLEANER

Laymon Mitchell, 307 Poinciana Dr., Homewood, Ala. 35209

Continuation-in-part of Ser. No. 316,344, Dec. 18, 1972, abandoned. This application Nov. 26, 1973, Ser. No. 418,931
Int. Cl. B65g *45/00*
U.S. Cl. 198—230 **3 Claims**

1. In combination with a flexible belt entrained for movement about a pulley:
- a cleaning roller 3 to 5 inches in diameter rotatably mounted about a rotational axis substantially parallel to that of the pulley;
- means mounting said roller for rotation in peripheral contact with the belt and for adjustably positioning said roller with respect to said belt;
- drive means drivingly connected to said roller for imparting rotation thereto in a direction corresponding to the direction of movement of said belt and a roller speed of 1⅛ to 2½ times the speed of movement of said belt;



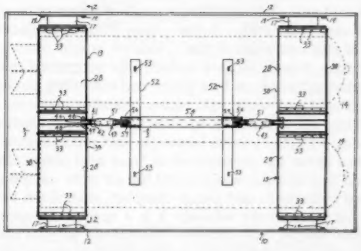
- said cleaning roller includes a plurality of circumferentially spaced continuous formations of a width of 1 to 1½ inches and projecting ¼ to ½ inch radially on said roller and forming helical grooves therebetween;
- the helix angle of said formation, measured perpendicular to the axis of said roller, is within the range of 30° to 45°; and
- the diameter of said roller increases from the center to each side of said roller at a rate of up to ⅛ inch in 12 inches.

3,888,346

CONTAINER FOR SUSPENDING A BOMB-LIKE MEMBER

Raymond L. Lancaster, Cullman, Ala., assignor to Lanson Industries, Inc., Cullman, Ala.

Filed Mar. 25, 1974, Ser. No. 454,560
Int. Cl. B65d *81/02*; **F42b** *37/00*, *39/00*
U.S. Cl. 206—3 **11 Claims**



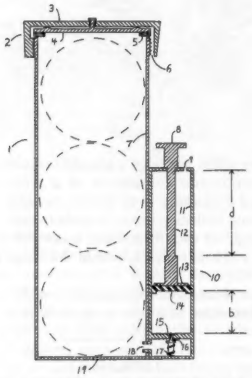
1. A container for suspending a bomb-like member comprising:
- a. a generally horizontal support extending transversely of the container,
- b. at least one pair of upstanding, spaced apart, fixed brackets carried by said horizontal support,
- c. resilient means supporting the ends of said horizontal support from said container,
- d. an upstanding, movable bracket pivotally connected adjacent its lower end to each of said fixed brackets,
- e. means limiting outward pivotal movement of the movable brackets carried by each said pair of fixed brackets away from each other, and

f. a flexible support member connected adjacent opposite ends thereof to upper portions of said movable brackets and extending therebetween in position to extend transversely beneath and support a portion of a bomb-like member.

3,888,347
INFLATED CONTAINERS FOR FLUID PRESSURIZED BALLS

Thomas Rollin Kramer, 5056 MacArthur Blvd., N.W., Washington, D.C. 20016

Filed Aug. 6, 1973, Ser. No. 385,792
Int. Cl. B65d *85/00, 51/10*
U.S. Cl. 206—315 **3 Claims**



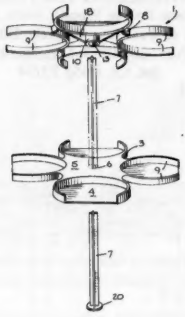
1. A ball storage container comprising a hollow pressure-tight first cylinder provided with a removeable cap, pump means connected to said first cylinder to inflate said first cylinder to a fixed maximum pressure, said pump means comprising a hollow second cylinder having end walls, a false bottom located in said second cylinder a spaced distance from one of said end walls to define a small chamber adjacent one of said end walls and a larger piston chamber adjacent the other of said end walls, a piston located in said piston chamber, a pump handle located outside said second cylinder and connected to the piston by a piston rod extending through the other of said end walls, said piston chamber communicating pressurized air to said first cylinder through said small chamber, a one way check valve located in said small chamber with means to admit the pressurized air from said piston chamber into said first cylinder and prevent the air from escaping from said first cylinder to said piston chamber, said piston having a maximum downstroke wherein it is a spaced distance from said false bottom, said distance determined so that said first cylinder can be inflated only to said fixed maximum pressure when the pump is used at normal atmospheric pressure.

3,888,348
PACKAGE FOR TUMBLERS AND THE LIKE

Raymond C. Frey, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio

Filed Aug. 15, 1973, Ser. No. 388,406
Int. Cl. B65d *85/62*
U.S. Cl. 206—427 **3 Claims**

1. An improved molded plastic package for cylindrical articles comprising the combination of:
a plastic base with a central aperture;
a plurality of spaced article receiving receptacles on said base;
a plastic cover with a central receptacle;
a plastic post passing through said base aperture and connecting the receptacle on said cover to a central portion of said base for positioning a plurality of articles between said cover and said base;
a plurality of outwardly directed arcuate article clips on said cover forming a major part of a circle positioned for engaging arcuate portions of the article tops;

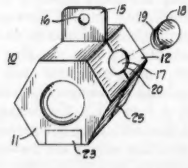


said post comprising an elongated member having a plurality of splines for frictionally engaging said base aperture and said cover receptacle; and
said cover receptacle including a locking detent for frictionally engaging said post and for positioning said cover clips with respect to said base receptacles.

3,888,349
DISPLAY PACKAGE

Raymond W. MacFarland, Jr., 9508 Fairmount Blvd., Novelty, Ohio 44072

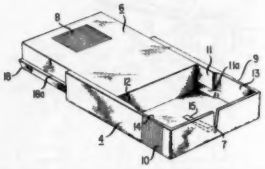
Filed Sept. 18, 1972, Ser. No. 289,978
Int. Cl. B65d *79/00*
U.S. Cl. 206—457 **11 Claims**



1. A reclosable display package containing a plurality of similar items for display on a display rack, comprising in combination:
a substantially rigid molded plastic body member forming a hollow package to contain the plurality of similar items, said body member having a tab extending therefrom and lying in a substantially flat plane,
said tab having a support aperture for hanging the package from the rack,
at least a portion of said body member extending outwardly of said plane and having an opaque surface,
each of the similar items having a substantially identical symmetry about less than three mutually perpendicular axes,
an access aperture in said body member,
a plug cooperating with said access aperture to secure to said access aperture to provide a reclosable access to the package,
the shape of said opaque surface of said body member having substantially the appearance of one of the plurality

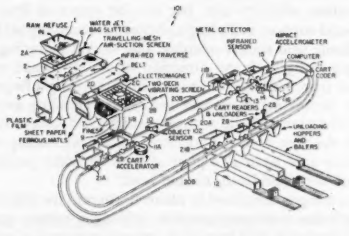
of similar items to convey a visual impression of one of the plurality of similcr items contained therein,
and said opaque surface being color coded to further indicate a characteristic of the items in the package.

3,888,350
SAFETY CONTAINER
William Horvath, 10 Crestwood Dr., Watchung, N.J. 07060
Filed May 10, 1974, Ser. No. 468,759
Int. Cl. B65d *85/42*
U.S. Cl. 206—531 **9 Claims**



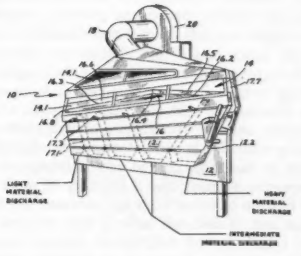
1. A safety container which comprises in combination:
a rectangular drawer,
a substantially rectangular cover comprising a closed top and depending rear and side walls, and constructed to move slidably to and fro on said drawer between closed and opened positions by engagement with guide means on opposite lateral walls of said drawer,
means comprising a cam-like member projecting downwardly from the underside of said cover intermediate between said side walls,
said cam having an edge disposed to form with the inner rear wall of said cover a slot for accommodating the peripheral edge of the rear wall of said drawer,
said cam tapered in decreasing thickness from back to front, forming at its frontal end a smooth junction with the underside of said cover,
and means constructed and arranged when said container is locked in closed position to respond to pressure on the two lateral walls of said cover adjacent its closed rear end to distend the top of said cover adjacent said slot thereby raising said cam and releasing the peripheral edge of the rear wall of said drawer from said slot to override the said cam.

3,888,351
AUTOMATIC REFUSE RECLAMATION SYSTEM
David G. Wilson, Cambridge, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.
Filed May 31, 1974, Ser. No. 475,488
Int. Cl. B01d *37/02*
U.S. Cl. 209—75 **10 Claims**



1. A refuse-separation system that comprises, in combination:
pre-sorter means that includes means for mechanically agitating the refuse to break up clumps and to divide fines in the refuse from the large items therein and means to remove loose paper and plastic;
a plurality of carts, each being the leading cart of a queue of carts on a closed-loop track, positioned to receive the individual large items from the pre-sorter means;
acceleration means to propel each leading cart down the track and to accelerate the next cart in queue into position;
object-detector means to detect entry of a large item into each leading cart and connected to actuate the acceleration means for that cart;
propulsion means to move each accelerated cart around its closed-loop track;
uncoupling means to discontinue the propulsion means when the cart encounters another cart in a queue of carts;
sensor means to provide signature-type messages from each individual large item and to provide a signal indicative of a plurality of characteristics of the individual large item present in each cart;
means for analyzing the signal to provide an indication of the character of the individual large item sensed; and means for removing the individual large item from each cart at a location determined by the characteristics of the item as indicated by said signal and interpreted by the means for analyzing.

3,888,352
GRAVITY SEPARATOR
Leslie G. Kulseth, Thief River Falls, Minn., assignor to Forsbergs, Inc., Thief River Falls, Minn.
Filed June 21, 1974, Ser. No. 481,534
Int. Cl. B07b *13/10*
U.S. Cl. 209—115 **8 Claims**

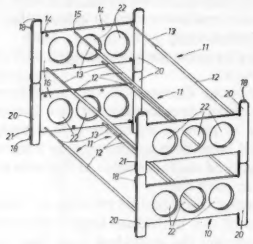


1. A high capacity gravity separator for separating particulate material as to weight and comprising a stationary base; a substantially triangular deck mounted for side-to-side and up and down oscillation on the base and having a front edge from which separated particles are received and two side edges forming with the front edge respective side vertices and converging rearwardly to form a rear vertex, the deck sloping gently downwardly from the rear vertex to the front edge and from one side vertex to the other; a discharge port spaced above the deck for dropping a stream of particles toward the deck adjacent the rear vertex; and air flow means for directing a stream of air transversely through the falling particle stream and toward the lower vertex to cause lighter particles to separate from the falling particle stream and to be preferentially conveyed by the air stream toward the lower deck vertex, whereby the separation on the deck of lighter particles from the remaining particles is largely avoided.

3,888,353
STAND FOR STORAGE OF SHOES

Günter Leifheit, Nassau, Lahn, Germany, assignor to Leifheit International Günter Leifheit GmbH, Nassau, Lahn, Germany

Filed June 18, 1973, Ser. No. 371,245
Claims priority, application Germany, June 19, 1972, 2229084
Int. Cl.[2] A47F 7/08
U.S. Cl. 211—37 4 Claims



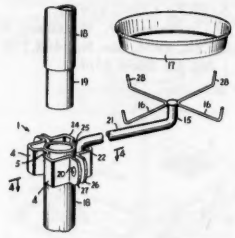
1. A stand for storage of shoes, comprising a pair of I-shaped end members each having a center portion and a pair of crossbar portions having parts which extend beyond opposite sides of said center portion at the respective ends thereof, each of said crossbar portions having an edge face facing away from the other crossbar portion and each of said parts having an end face extending substantially normal to the associated edge face so that each end member may be placed on a supporting surface in a position in which one of said edge faces or two of said end faces are juxtaposed with said supporting surface, said center portion of each of said end members being provided with a plurality of sockets aligned with corresponding sockets provided in the center portion of the respective other end member; a plurality of shoe-supporting telescopic crossties each having spaced end portions lodged in the respective aligned sockets of said end members and interconnecting the latter at a distance from one another which is adjustable by telescoping said crossties, the length of said shoe stand being variable at will by changing said distance between said end members of said pair with attendant telescoping of said crossties, and the working height and width of said shoe stand being selectable in dependence upon whether respective edge faces or end faces of said end members are juxtaposed with supporting surface; and a plurality of male and female portions in form of projections and recesses provided on said edge faces and on said end faces of said crossbar portions of said end members and adapted to engage complementary connecting crossbar portions of an identical additional shoe stand so that a stacked array may be provided which is composed of a plurality of said shoe stands.

3,888,354
ADJUSTABLE BRACKET ASSEMBLY

Efraim Margolin, and Michael Grunstein, both of New York, N.Y., assignors to Grun Mar Industries Inc., New York, N.Y.

Filed July 25, 1973, Ser. No. 382,459
Int. Cl. A47f 5/08
U.S. Cl. 211—110 5 Claims

1. A bracket assembly comprising a front plate and a rear plate, said front plate having a recessed section with a forward section positioned on each side of said recessed section, said rear plate having a rearward section and a front section positioned on each side of said rearward section, a support opening defined by said front section and said recessed section and a support in said support opening, a plurality of holes defined by said forward section and support element and by said rearward section and support element, each hole being adapted to receive a support rod therein, at least one support rod in one of said holes, and means on both ends of said front and rear plates for adjustably connecting said front and rear plates, said means being positioned on either side of said support and being adjustable to move said plates to a first

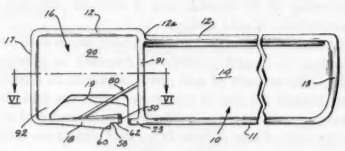


position in which said front section and recessed section firmly engages said support, said support rod being loosely held in said holes in said first position and to a second position in which the support is more firmly engaged and in which said support rod is firmly engaged in said holes.

3,888,355
SLACKS HANGER

Judd F. Garrison, Grand Rapids, Mich., assignor to John Thomas Batts, Inc., Zeeland, Mich.

Continuation-in-part of Ser. No. 91,036, Nov. 19, 1970, abandoned. This application Nov. 12, 1971, Ser. No. 198,238
Int. Cl. A17f 5/00
U.S. Cl. 211—123 16 Claims



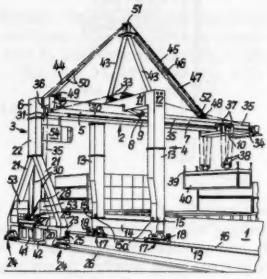
1. A hanger for slacks and the like having a bar and support member, said bar having an elongated body portion and a head portion at one end thereof, said support having a socket opening through one end thereof for receiving said head portion, the improvement in said hanger comprising: a resiliently flexible latch on one of said head and said support and a keeper on the other thereof; said latch being biased to a first position engaging said keeper to lock said bar against disengagement from said support and being movable out of said first position whereby said bar can be removed from said socket; said support including a socket for receiving said head and defining said socket opening; said socket including walls which generally limit the direction which said head can be extracted from said socket; said latch comprising a finger-like member depending from said head and extending generally towards the plane of said socket opening; said keeper lying in front of the free end of said latch; and a restraining means connecting said latch at a point spaced from the junction of said latch with said head, to said head.

7. The hanger described in claim 6 wherein the end of said latch includes a cutaway portion defining a keeper abutting face for engaging said keeper to prevent removal of said bar when said latch is moved into said wall opening and a stop face engageable with said keeper to prevent said latch being manipulated completely through said wall opening.

3,888,356
METHOD OF ASSEMBLING AN UNLOADING CRANE

Hans Redelfs, Wilhelmshaven, Germany, assignor to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed Feb. 7, 1974, Ser. No. 440,471
Claims priority, application Germany, Feb. 10, 1973, 2306722
Int. Cl. E04b 1/00
U.S. Cl. 212—15 7 Claims

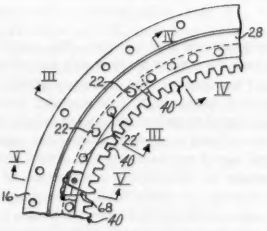


1. A method of mounting a crane having a bridge beam with a hoisting mechanism, and front and rear support means each of which is provided with a travelling beam having hinged thereto post means pivotable from an at least approximately horizontal position to an upright position, which includes the steps of: respectively placing said travelling beams upon crane rails and temporarily holding the same in a position in which they are spaced from each other in a direction transverse to the longitudinal extension of said front and rear travelling beams, placing a rear portion of said bridge beam upon the travelling beam of said rear support means and on a temporary auxiliary support, subsequently pivoting said post means into upright position and fixedly securing same to the pertaining travelling beam, hoisting said bridge beam upwardly and placing the same into its final position relative to said front and rear support means and connecting same to said post means.

3,888,357
SWING BEARING WITH BOLT-ON SEGMENTED GEAR

Ralph L. Bauer, and Fred E. Simpson, both of Oswego, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Nov. 15, 1972, Ser. No. 306,707
Int. Cl. B66c 23/84
U.S. Cl. 212—68 9 Claims



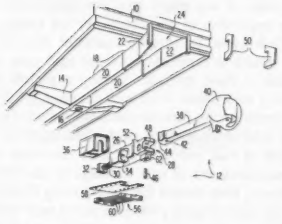
1. The combination of a swing bearing and swing gear for an excavator, comprising:
an outer annular bearing race member;
annular means including a pair of annular members defining inner bearing race means;
said race members defining a raceway for receiving a plurality of bearing elements to support said members relative to one another;
a plurality of arcuate gear segments detachably secured to said inner race member and defining an endless series of gear teeth forming a ring gear; and,
said arcuate gear segments include a flange secured between said annular members.

8. The combination of a swing bearing and swing gear for an excavator, comprising:
an outer annular bearing race member;
annular means defining an inner bearing race member;
said race members defining a raceway for receiving a plurality of bearing elements to support said members for rotation relative to one another;
a plurality of arcuate gear segments, each having a flange extending radially therefrom and detachably secured to said inner race member and defining an endless series of gear teeth evenly spaced both circumferentially and radially to define an internal ring gear for driving engagement and relative rotation with a pinion gear;
a mobile carriage;
a platform rotatably supported on said mobile carriage by said swing bearing and including means for enclosing said ring gear; and
means permitting replacement or removal of one or more gear segments, said means comprising an opening in said means for enclosing said ring gear having a length greater than a single gear segment but less than two segments for selectively providing access to any one of said gear segments without removal of said platform.

3,888,358
COUPLING ASSEMBLY

Richard C. Farris, Joshua, Tex., assignor to Halliburton Company, Duncan, Okla.

Filed July 25, 1974, Ser. No. 491,950
Int. Cl. B61g 9/00
U.S. Cl. 213—69 9 Claims



1. In a coupling assembly including:
a sill connected to the underframing of a railway vehicle; a coupler bar including a coupler head and an elongated coupler shank extending into a forward portion of the sill, one end of the coupler shank opposite the coupler head having an aperture extending therethrough; a yoke operably interconnecting the sill and the apertured end of the coupler shank, the yoke having opposed essentially parallel legs extending forwardly toward the coupler bar and coaxial apertures extending transversely through the legs; and a circular cylinder coupler pin extending through the apertures of the yoke and the aperture of the coupler shank to pivotally connect together the coupler bar and the yoke;
the improvement comprising:
a plurality of bounding surfaces forming in each leg of the yoke an enlargement of the aperture therein, one of the bounding surfaces forming a vertically planar forwardmost bounding surface of the aperture orthogonally oriented relative to the longitudinal axis of the leg; and a pair

of inserts each removably mounted in a forward portion of the aperture of a leg of the yoke and including

force receiving means for receiving draft forces transmitted from the coupler shank through the coupler pin; and

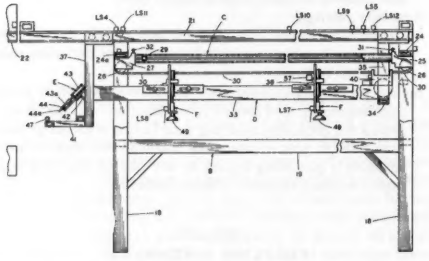
force distributing means connected to said force receiving means for distributing forces received by said force receiving means over the planar, forwardmost bounding surface of the aperture of the leg to reduce the concentration of forces exerted on the leg through the coupler pin.

3,888,359

MATERIAL HANDLING APPARATUS

Wilbur L. Moline, Joliet, Ill., assignor to Kemlite Corporation, Joliet, Ill.

Filed Oct. 1, 1971, Ser. No. 185,526
Int. Cl. B65h *5/10, 29/24*
U.S. Cl. 214—1 BB **27 Claims**



1. In apparatus for introducing a raw material sheet into a press, a carriage extendable into said press and retractable therefrom, a lip carried by said carriage and extendable under an edge portion of said sheet, said lip having a strip extending transversely thereof, a plurality of spaced needles carried by said carriage, and means for driving said needles through an edge portion of said sheet to a position behind said strip.

11. In apparatus of the character set forth, a press having jaws which open to receive material between said jaws, a carriage which is movable between said jaws into and out of said press, a fluid cylinder having a piston therein, means connecting said piston with said carriage whereby movement of said piston in one direction in said cylinder produces movement of said carriage into said press between said jaws and movement of said piston in another direction in said cylinder produces movement of said carriage in another direction out of said press, first means for introducing fluid into said cylinder on one side of said piston to move said piston in said one direction to extend said carriage into said press between said jaws, second means for introducing fluid into said cylinder on the other side of said piston to move said piston in said other direction to withdraw said carriage from said press, means on said carriage for picking up a finished sheet within said press after said carriage has been extended into said press, and means for starting the operation of said second means after the operation of said pickup means.

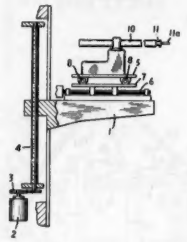
3,888,360

INDUSTRIAL ROBOT

Reijiro Ando, Funabashi, and Shigeru Iwai, Chiba, both of Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan

Filed Apr. 8, 1974, Ser. No. 459,099
Claims priority, application Japan, Apr. 11, 1973, 48-42718
Int. Cl. B25j *11/00*
U.S. Cl. 214—1 BB **4 Claims**

1. A programmable robot comprising, a bed means for moving the bed upwardly and downwardly, a base on said bed movable in opposite directions along two axes, a loading unit having a pneumatically operated lift member on said base operable upwardly and downwardly, a sweeping member on an upper end portion of said lift member mounted for rotation thereon, a transfer arm on said sweeping member having reciprocable means reciprocable horizontally, and a manipulator on said transfer arm reciprocable means having grippers for gripping articles, means rotatably mounting the manipulator on said transfer arm, and control means to effect three



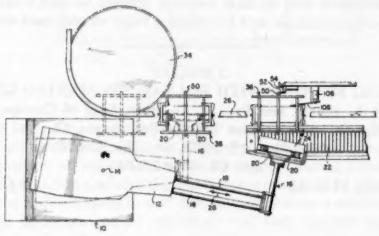
dimensional movements of said manipulator comprising means for controlling raising and lowering of the bed, and the lift individually and simultaneously, means in said control means to rotate said sweeping member, means in said control means to reciprocate said transfer arm, and means in said control means to rotate said manipulator relative to said arm, and means in said control means for controlling operating of said grippers.

3,888,361

PROGRAMMED MANIPULATOR ARRANGEMENT FOR CONTINUOUSLY MOVING CONVEYOR

John L. Becker, Sterling Heights, Mich.; Otto Hohnecker, Wilton, and Maurice J. Dunne, Newtown, both of Conn., assignors to Unimation, Inc., Danbury, Conn.

Filed May 15, 1974, Ser. No. 470,216
Int. Cl. B23k *9/12*
U.S. Cl. 214—1 BH **12 Claims**



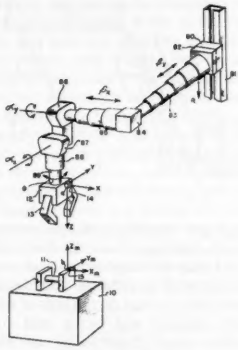
1. In a programmed manipulator, the combination of, a manipulator arm, means for moving said arm along a plurality of axes, a continuously moving conveyor positioned adjacent said programmed manipulator, first encoder means for developing a digital signal corresponding to the absolute position of said arm in one of said axes, second encoder means for developing a digital signal representing the actual position of said conveyor, means for developing a sequence of digital command signals having one component corresponding to desired positions of said arm along said one axis, means for comparing the encoder signal of said first encoder means and said one component of one of said command signals to develop an error signal equal to the difference therebetween, means responsive to said error signal for controlling said moving means to move said arm along said one axis in the direction to reduce said error signal, at least some of said command signals including an auxiliary control signal, and means re-

sponsive to said auxiliary control signal for connecting said second encoder means to said comparing means in place of said one component of said command signal, whereby the encoder signal of said second encoder means acts as a continuously variable series of command signals to control movement of said manipulator arm in said one axis in accordance with movement of said conveyor along the path thereof.

3,888,362
COOPERATIVE MULTIAXIS SENSOR FOR TELEOPERATION OF ARTICLE MANIPULATING APPARATUS

James C. Fletcher, Deputy Administrator of the National Aeronautics and Space Administration in respect to an invention of, and Alan R. Johnston, La Canada, Calif.

Filed May 31, 1973, Ser. No. 475,336
Int. Cl. G05b *1/06*
U.S. Cl. 214—1 B **6 Claims**



1. In apparatus for grasping an article under remote control, a system for detecting spatial position and orientation of a grasping effector relative to said article comprising

a sensor including a planar photodetecting means divided into four quadrants to define X and Y coordinates, and a first light emitting diode means on a Z axis normal to the X and Y axes and the plane of said photodetecting means, two additional light emitting means equally spaced on each side of said first diode in a plane defined by said X and Z axes, and means for sequentially energizing said light emitting means, and

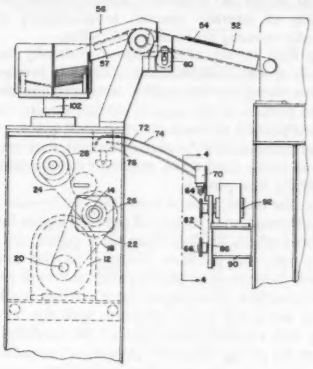
a target comprising two plane mirrors and a corner retroreflector mounted on said article to reflect images of said light emitting means as they are energized in sequence in order to produce signals from said quadrants which, when combined and nulled, will align said X, Y and Z axes of said sensor with corresponding axes X_m, Y_m and Z_m of said target where said Z_m axis is at equal angles from all sides of said retroreflectors, said X_m axis is perpendicular to said Z_m axis and passes through each of said two plane mirrors disposed on opposite sides of said retroreflector, and said Y_m axis is perpendicular to said Z_m and X_m axes, and will also decrease the distance between the sensor and the mirror to a predetermined value.

3,888,363
INDEXING STACKER

Arthur B. Erekson, San Diego, Calif., assignor to Borden, Inc., Columbus, Ohio

Filed Oct. 29, 1973, Ser. No. 410,436
Int. Cl. B65g *57/14;* **B65h** *33/14*
U.S. Cl. 214—6 D **10 Claims**

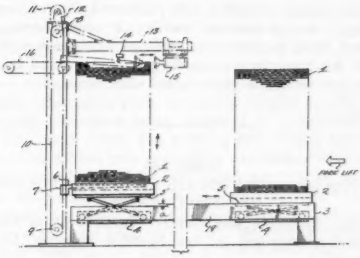
1. Apparatus, including a stacker and a conveyor means having an article supporting surface, for stacking substantially flat individual articles of a regular geometric form, said stacker comprising four compartments having a common apex; a common dividing wall between adjoining compartments; a peripheral wall disposed on the outside of each compartment defining an outside wall thereof, said peripheral walls are in a diagonal disposition and are of a lesser vertical extent than said dividing walls and said surface of said conveyor means; and a bottom wall defining the floor of each compartment disposed with an inclination in the X and Z planes directed downwardly to the common apex; wherein said conveyor means moves the articles to one of said compartments at a time.



3,888,364
UNLOADER SYSTEM

Yoshio Inoue, and Yasuaki Sato, both of Mihara, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed June 27, 1973, Ser. No. 374,096
Claims priority, application Japan, July 19, 1972, 47-71634
Int. Cl. B65g *59/02*
U.S. Cl. 214—8.5 A **1 Claim**



1. An unloading system for stacked sheets, comprising:

a frame structure including horizontal frame means having upwardly presented support surface means which is presented at a higher level along a first portion of the length of the support surface means and which steps down to a lower level along a second, longitudinally adjacent portion of the length of the support surface means,

a travelling truck mounted on the frame structure for forth and back movement along the horizontal frame means;

a platform;

means mounting the platform on the travelling truck for movement therewith along the frame structure, said mounting means mounting the platform for vertical movement between an upper level wherein the platform

lies above the upwardly presented support surface means of the horizontal frame means of both said first and second portions of the support surface means and a second, lower level wherein the platform lies below the higher level of support surface means, but above the lower level of the support surface means;

a pallet for support at least two longitudinally side-by-side vertical stacks of horizontal sheets, means defining a plurality of laterally spaced, longitudinally extending upwardly opening grooves in the pallet;

a lifting fork having a plurality of generally horizontal, laterally spaced, longitudinally extending prongs;

means mounting the lifting fork overlying one end of the second portion of the support surface means, away from the first portion of the support surface means;

the pallet being sized to be carried on said platform and said grooves being sized to be entered by respective ones of said lifting fork prongs,

whereby, the pallet, with at least two side-by-side stacks of sheets thereon, may be loaded onto the higher level of the support surface, the travelling truck positioned therebeneath with the platform lowered to the lower level thereof, then raised to lift the pallet and stack clear of the support surface, whereupon the travelling truck may be moved along the frame structure with the level of the lifting fork relative to the level of the platform adjusted so that the prongs enter the grooves of the pallet, so that both stacks may be transferred from the pallet to the lifting fork, whereupon the platform may be lowered to the lower position thereof, with the pallet remaining thereon, the travelling truck may be moved back so that only the foremost stack no longer overlies the pallet, whereupon the level of the lifting fork relative to the platform may be changed to cause the remaining stack to be again supported on the pallet on the platform on the travelling truck and thus the remaining stack may be moved back out of the way of the lifting fork for placement on the lifting fork after the foremost stack has been consumed;

sensing means positioned with vertical spacing over the lifting fork for sensing when the lifting fork is raised to such an extent that the top of the stack supported on the lifting fork is disposed at a predetermined level;

a conveyor positioned beside the lifting fork adjacent said predetermined level; and

pusher means mounted and positioned intermittantly to engage a predetermined number of sheets at once and to push them laterally from the top of the stack supported on the lifting fork when the top of that stack is at said predetermined level, and onto said conveyor.

3,888,365

STORAGE AND PROCESSING APPARATUS FOR RECORD CARRIERS

Herbertus Reimann, and Gunter Clauss, both of Dresden, Germany, assignors to Veb Pentalon Dresden, Dresden, Germany

Filed Mar. 5, 1973, Ser. No. 338,240
Int. Cl. B65g *1/04*
U.S. Cl. 214—16 B **1 Claim**

1. A storage and processing apparatus for record carriers contained in storage units arranged adjacent to each other on a support, comprising:

a plurality of storage units with record carriers;

at least one horizontally disposed rod forming a part of said support, means on each of said storage units for suspending said storage unit from said rod;

a coding surface on one side of each of said storage unit, coding elements mounted on said coding surface, means extending along a side opposite to the coding surface to prevent pivotal movement of said storage units when suspended on said rod;

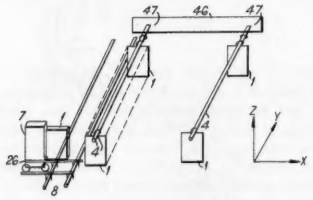
at least one movable collecting bar with pins thereon for supporting said storage units, means mounting said pins on said collecting bar in a substantially horizontal position in an axial alignment position with said rod;

record carrier processing station for processing said record carrier contained in said storage unit;

a seeker unit, at least one seeker head mounted on said seeker unit and operative to scan said coding surface to detect a selected code formed by said coding elements, detecting means mounted on said seeker head to detect said coding elements, each of said detecting means being located at a level corresponding to the level of a coding element;

storage unit retrieval means mounted on said seeker head, said retrieval means being operative to remove or deposit a storage unit relative to said rod and said pins;

means mounted on said seeker unit to move said seeker head and storage unit retrieval means thereon to a plural-



ity of storage unit handling positions normal to said rod;

track means extending at least the combined distance of said rod and pins for supporting said seeker unit for movement in a path parallel to said rod and pins, said track means being located on the side of said storage unit immediately adjacent and facing said coding surface, means to effect travel of said seeker unit along said track means whereby said seeker head and storage unit retrieval means can transfer said storage units between said rod and said pins;

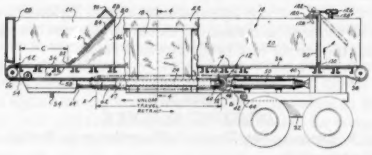
means for effecting and supporting said collecting bar for movement from a first position wherein said pins are axially aligned with said rod to a second position wherein said pins are position at said record carriers processing stations, means located at said processing station for controlling the movement of said collecting bar thereat and reciprocal means located adjacent one side of said collecting bar opposite to said pins for transferring said storage unit from said pins on to said rod.

3,888,366

SELF-UNLOADING VEHICLE

Eugene D. Prahst, Franklin, Wis., assignor to The Heil Co., Milwaukee, Wis.

Filed Aug. 30, 1973, Ser. No. 392,902
Int. Cl. B60p *1/00*
U.S. Cl. 214—83.22 **12 Claims**

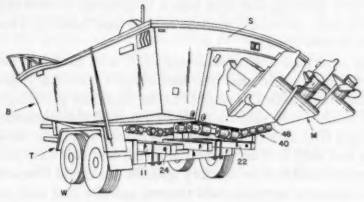


1. A self-unloading wheeled vehicle comprising a vehicle body having a floor and side walls extending upwardly therefrom. a transversely-extending rear roller journalled adjacent the rear end of the floor of said body, a flexible belt having an

upper stretch normally covering said body floor and having a front end normally positioned adjacent the front of the body, said belt extending around said rear roller and having a first lower stretch extending forwardly beneath said body floor and a second lower stretch looped back to extend rearwardly beneath said body floor to a location where its end is deadended, spaced longitudinally-extending tracks supported beneath said floor, a drive roller having means at its ends for guiding engagement with said tracks positioned to rollably engage said looped portion of said belt between said forwardly and rearwardly-extending stretches thereof, and power means for said drive roller to move the belt forwardly beneath the body floor when the power means is operated in one direction to thereby cause the upper portion of the belt to move rearwardly over said body floor to unload the body, and means connecting said drive roller with the front end of said belt for returning the belt to normal position when the power means is operated in a reverse direction.

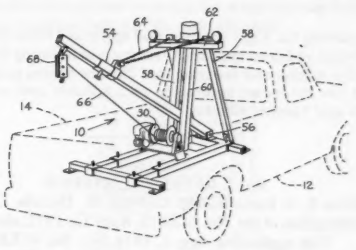
7. A self-unloading wheeled vehicle comprising a vehicle body having a floor and side walls extending upwardly therefrom, a transversely-extending roller at the rear end of said floor, a flexible belt normally covering said floor and extending around said roller, said flexible belt having a front end normally positioned adjacent to the front of the body, means for moving said belt rearwardly around said rear roller to eject the load from said vehicle body and for subsequently moving said belt forwardly to return it to its normal position, and a fixed bulkhead spaced a predetermined distance from the front of the body to provide an unloaded front belt portion which can accommodate fallback during an unloading operation, said bulkhead comprising a sloping central panel sloping downwardly toward the front of the vehicle, and a pair of converging side panels joined to opposite sides of said central panel, said central panel and side panels being spaced sufficiently above said belt to permit movement of the later.

3,888,367
BOAT TRAILER
William F. Cox, P.O. Box 338, Grifton, N.C. 28530
Filed Sept. 3, 1974, Ser. No. 502,679
Int. Cl. B60p *3/10*
U.S. Cl. 214—84 **7 Claims**



1. In a boat trailer, a wheel-carried main frame having a forward tongue with means for connecting to a towing vehicle, and means for supporting a boat on said main frame comprising an auxiliary frame pivoted on said main frame adjacent its rear end, a central keel roll on the front end of said auxiliary frame and a plurality of roller assemblies on the rear end of said auxiliary frame, one of said assemblies being pivotally mounted on a longitudinal axis on each side at the rear end of said auxiliary frame, each of said assemblies having transverse arms pivoted on said auxiliary frame on said longitudinal axis, a longitudinal member pivoted at an intermediate part on the end of each transverse arm on a transverse axis, a pair of transversely spaced resilient rollers rotatable on each end of each said longitudinal member, each of said rollers being mounted on a transverse axle with substantial play between said roller and axle to provide universal movement of said roller on said axle, the transverse and longitudinal pivotal axes of each assembly providing for universal movement of the assembly so that all eight rollers of each assembly will engage a boat hull supported thereon, the universal mounting of the individual rollers providing substantially surface contact with the hull along the circumference of the rollers, the axes of the rearward rollers lying approximately in a vertical plane so as to underlie a boat hull adjacent the transom from the keel to the outermost rollers and provide support for said transom, including an outboard motor if carried by the transom.

3,888,368
WRECKER ATTACHMENT
Wallace H. Hawkins, Rt. 7 Buncombe Rd., Greenville, S.C. 29609
Filed Sept. 6, 1973, Ser. No. 394,745
Int. Cl. B66c *23/44*
U.S. Cl. 214—86 A **2 Claims**

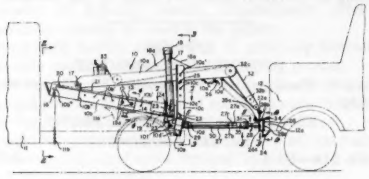


1. A wrecker attachment for mounting on the frame of a pickup truck and the like comprising: a base supporting member having a pair of laterally spaced elongated supporting members, each of said elongated supporting members including interconnected telescoping parts for varying the overall longitudinal length of said elongated supporting members movable longitudinally in unison to so vary the length, forward and rearward transverse tubular members carried adjacent opposite ends of said elongated supporting members maintaining a fixed transverse spacing between said elongated supporting members forming a fixed base, at least four laterally extending telescoping, independently adjustable extensions projecting outwardly from ends of said transverse tubular members each exension independently laterally adjustable relative to said base and longitudinally adjustable in pairs, brackets carried by said telescoping extensions having holes therein adapted to receive bolts for securing said base supporting members, telescoping parts, transverse tubular members and telescoping extensions being disposed in substantially the same horizontal plane, and, a lifting and towing hoist supported on said fixed base, said lifting and towing hoist having a boom pivoted on said forward transverse tubular member, a winch and cable, said cable being supported by an outer end of said boom for lifting heavy objects whereby said telescoping extensions and said telescoping parts forming said base supporting member can be adjusted so that said wrecker attachment can be mounted on various size trucks.

3,888,369
VEHICLE TOW RIG
Banks E. Kesselring, R.D. 1, St. Thomas, Pa. 17252
Filed Sept. 16, 1974, Ser. No. 506,540
Int. Cl. B60p *3/12*
U.S. Cl. 214—86 A **9 Claims**

1. Vehicle tow rig comprising in combination an A-frame for mounting in a substantially vertical plane with the lower leg in a substantially horizontal position and the two legs thereof pivotally connected at the apex; means for connecting said lower leg with the fifth wheel of a retrieving tractor; means for securing the apex of said A-frame to said tractor; means for securing the rear of the A-frame to the rear of said

tractor; means secured to the upper leg of said A-frame and to a bumper member for correspondingly raising and lowering said bumper member relative to said upper leg for attachment to a vehicle to be towed; power means for increasing and



decreasing the angle between said upper and lower legs of the A-frame and correspondingly raising and lowering said upper leg for raising and lowering said bumper means and vehicle; and tow for means secured to said A-frame and connecting with said bumper member.

3,888,370

BALL RETRIEVAL SYSTEM

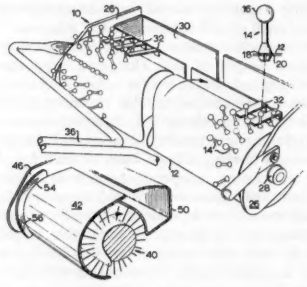
William E. S. Gamblin, 995 Carleton Pl., Ontario, Calif.

Continuation of Ser. No. 243,813, April 13, 1972, abandoned. This application Apr. 4, 1974, Ser. No. 457,832

Claims priority, application Canada, Apr. 26, 1971, 111308

Int. Cl. B60p 1/00

U.S. Cl. 214—356 **2 Claims**



1. A ball retriever comprising: a rotor having a pair of ends and a cylindrical outer surface, a plurality of peg receiving means in spaced row array about the cylindrical outer surface for receiving a peg in each said means, a plurality of resilient pegs, each of said pegs including an enlarged spherical head portion and a base portion, said base portion including means for mating with said peg receiving means, said base portion means comprising an endless groove and said receiving means comprising a slot for mating with said endless groove, a one of said pegs mounted in mating relation in a one of said peg receiving means with said enlarged spherical head portion extending outwardly of said cylindrical outer surface and forming a plurality of pockets, each of said pockets being adapted for trapping a ball of predetermined size in snug relation therein, a journal mounted centrally at each of said rotor ends, a pair of end plates, one of said end plates carried by each said journals, a ball receptacle carried by said end plates, said ball receptacle including a plurality of displacer plates spaced along a peripheral edge of said ball receptacle and a one of said displacer plates between each of the adjacent rows of pegs proximate the top excursion of said cylinder for directing trapped balls from within a pocket to said ball receptacle, and means for propelling said ball retriever secured to said end plates.

3,888,371

PUBLIC WORKS MACHINES AND PARTICULARLY TO BUCKETS THEREFOR

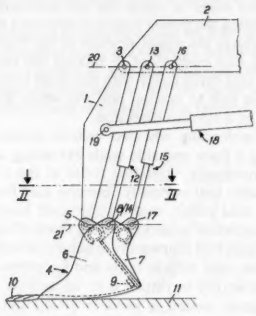
Rene V. Moreau, Ermenonville, France, assignor to Societe Anonyme: Poclain, Oise, France

Filed June 19, 1974, Ser. No. 480,869

Claims priority, application France, June 28, 1973, 73.23787

Int. Cl. E02f 3/30

U.S. Cl. 214—767 **8 Claims**



1. A Public Works machine comprising:
a support;
a balance beam mounted on said support for pivotal movement about a first spindle;
a bucket which is mounted on said balance beam for pivotal movement about a second spindle and includes a casing, a base pivotable about a third spindle on said casing and a stop for limiting pivotal movement of said base relative to said casing;
a first hydraulic jack for positioning said casing relative to said support and which is coupled to said support by a first primary spindle and to said casing by a second primary spindle;
and a second hydraulic jack for positioning said base relative to said support and which is coupled to said support by a first secondary spindle and to said base by a second secondary spindle;
wherein said first and second spindles, said first and second primary spindles and said first and second secondary spindles are parallel and offset in respect of the common pivoting plane of said bucket and said balance beam, and the distances between said first spindle and said first primary spindle, said first spindle and said first secondary spindle, and said first primary spindle and said first secondary spindle are equal respectively to the distances between said second spindle and said second primary spindle, said second spindle and said second secondary spindle and said second primary spindle and said second secondary spindle.

3,888,372

FRONT END LOADER DEVICE

Oliver L. Gorby, Fargo, N. Dak., and Dennis A. Rice, Cedar Falls, Iowa, assignors to Dynamic Industries, Inc., Barnesville, Minn.

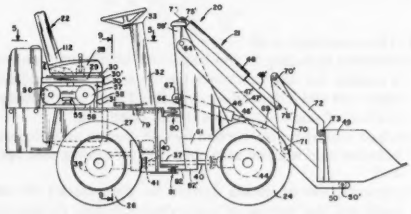
Filed June 1, 1973, Ser. No. 366,104

Int. Cl. B66f 9/00

U.S. Cl. 214—776 **2 Claims**

2. A front end loader comprising a front and rear frame spaced from one another, an articulated connection connecting the front and rear frames together loading arms pivotally mounted to the front frame hydraulic cylinder means to actuate the loading arms, said rear frame having an engine compartment with an engine mounted therein for powering the loader, an operator's seat mounted directly over the engine

compartment, an operator's control panel mounted to said rear frame spaced in front of said engine compartment, a floor for the operator's feet extending from the bottom of the engine compartment to the bottom of the control panel, said articulated connection comprising three swivel connections, one of said swivel connections connecting the lower edge of the rear frame to the lower edge of the flat frame by means of relatively short lug means extending from the rear frame and relatively short lug means extending from the front frame overlapping one another with a swivel connection therebetween, said second of said swivel connections comprising a relatively long plate adjacent the upper end of the rear frame and a relatively short lug means extending from the upper edge of the front frame with the forward end of the plate and short lug means in overlapping relation to one another with a swivel connection therebetween, said rear end of the plate extending a substancial distance into the rear frame along the floor thereof with the rearward end of the plate rearward of the control panel and with a swivel connection connecting the



rear end of the plate to the floor, said loader having a hydrostatic drive for powering said loader, said engine powering said hydrostatic drive, a foot pedal member is mounted to the floor of the rear frame between the engine compartment and control panel, said foot pedal member being positioned in length on said floor at a lateral angle extending horizontally toward one lateral side of the loader in relation to the longitudinal axis extending through the center of the rear frame from the rear to the front, said operator's seat being aligned along said longitudinal axis so that the foot pedal will be at an angle in relation to the operator's seat with the forward end of the pedal diverging laterally outward further than the rearward end of the pedal, said pedal being pivotally mounted about a horizontal axis perpendicular to said lateral angle to move upward and downward while remaining in said angled relation for the operating by the operator's foot while seated in the operator's chair, said hydrostatic drive being mounted in alignment with said longitudinal axis, an offset swivel connection means connecting said pedal to the hydrostatic drive whereby the pedal movement controls the hydrostatic drive.

3,888,373

CHILD-RESISTANT CLOSURE

Peter P. Gach, and Gary V. Montgomery, both of Evansville, Ind., assignors to Sunbeam Plastics Corporation, Evansville, Ind.

Filed Aug. 15, 1973, Ser. No. 388,594
Int. Cl. B65d *55/02*
U.S. Cl. 215—214 **2 Claims**

1. A child-resistant closure for containing liquid, said closure consisting of a container having a tubular neck, a body and a shoulder portion adjacent the base of said neck, and a cap for said container,

a. said container neck having a flat annular lip and a smooth cylindrical inner surface,

b. said cap having a disc-like top and three radially spaced concentric skirts depending from said top, the top of said cap having a central area overlying said container neck and an annular area circumjacent thereto and connecting said outermost skirt to said intermediate skirt,

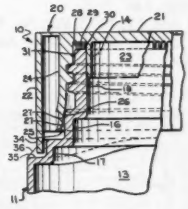
c. the outer surface of the innermost one of said skirts being substantially cylindrical and having an interference fit with the inner surface of said neck,

d. at least one annular, downwardly extending, flexible, first sealing element in the space between said innermost one of said skirts and the intermediate one of said skirts, said first element being engaged in sealing contact with said container lip when said cap is in closed position on said container,

e. cooperating mating threads on the exterior of said container neck and the interior of said intermediate skirt,

f. that portion of said cap top overlying said container neck and that portion of said intermediate skirt where said threads are located being substantially thicker in cross section than said innermost skirt, said outermost skirt and said annular area of said cap top,

g. the inner surface of said intermediate skirt and the outer surface of said neck having cooperating circumjacent areas that are opposed to each other when said cap is near to and in closed position on said container,



h. the first of said areas being the inner cylindrical surface of a portion of said intermediate skirt at a level spaced below said threads, said portion having an inner diameter greater than the outside diameter of the threads on said neck and a cross sectional thickness less than the thickness of that portion of said intermediate skirt where said cap threads are located,

i. the second of said areas being on said container neck and having integral, circumferentially extending, axially spaced and radially protruding sealing ribs thereon, said ribs having a diameter greater than the outside diameter of said threads and an interence fit interiorly with the first said area,

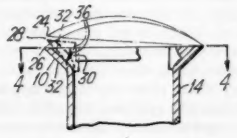
j. said first cylindrical surface having a greater axial extent than said ribs for effecting a seal therewith when said cap approaches closed position and when said cap is at closed position and for maintaining a seal when said cap shifts axially due to thread manufacturing tolerances.

3,888,374

SAFETY CLOSURES

Thomas David Smith, Apt. 101, 109 Jameson Ave., Toronto 3, Ontario, Canada

Filed Oct. 6, 1972, Ser. No. 295,673
Int. Cl. B65d *55/02, 85/56;* **A61j** *1/00*
U.S. Cl. 215—216 **4 Claims**



1. Safety closure means for containers comprising in combination with said container and a cap therefor, a first diametrical annular outwardly projecting rim around the mouth ofthe container and a second diametrical annular outwardly project-

ing rim around said cap, an annular outer edge of said first rim being in hairline annular contact with said second rim when said means is in closed position, said first rim being substantially unyielding for the predominant part of its circumference, and means for distorting said first rim at a predetermined point on its circumference so as to exert a pry upon said cap by way of said second rim and thereby expose an opening gap in said contact, said means for distorting said first rim taking the form of at least one cavity provided upon the circumference of said first rim so as to interrupt the continuity of its circumference, and an inwardly yieldable membrane spanning said cavity and joining said interrupted circumference upon the normally seen surface thereof so as effectively to conceal said cavity, inward pressure upon said membrane being transferred to said second rim to exert said pry, said cap having a domed upper outer surface.

3,888,375

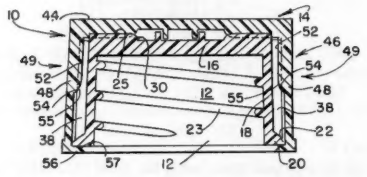
SAFETY CLOSURE ASSEMBLY

Richard G. Gerk, Palos Park, Ill., assignor to VCA Corporation, Baton Rouge, La.

Filed Dec. 17, 1973, Ser. No. 425,111

Int. Cl. B65d *55/02, 85/56;* **A61j** *1/00*

U.S. Cl. 215—219 **7 Claims**



1. A safety closure assembly comprising an inner closure cap having a top portion to cover the mouth of the container and a skirt to fit over the container immediately adjacent the opening, means on said inner closure skirt for engagement with members on the container, an outer cap of a size to receive said inner closure, said outer cap having a top portion and a skirt, with the skirt having a continuous and uninterrupted annular bottom edge, the underside of said top wall of said outer cap having spaced radially extending members and the top wall of said inner cap having spaced radially extending members adapted to be engaged by the spaced radially extending members of the outer cap when the outer cap is rotated in one direction to simultaneously rotate said inner cap to effect a closure of said inner cap with respect to said container and to permit a free rotation of said outer cap with respect to said inner cap when said outer cap is rotated in an opposite direction, said outer cap having a pair of spaced vertical slots extending from adjacent the top portion to adjacent the continuous and uninterrupted annular bottom edge to provide a skirt panel which is substantially the height of the skirt and which is radially deflectable inwardly by manual pressure, said deflectable skirt panel having means on the inside thereof which engage means on the skirt of said inner cap when said outer skirt panel is radially deflected so that when the said means are interengaged a rotation of the outer cap in the opposite direction will simultaneously rotate said inner cap to effect an unscrewing of said inner cap with respect to the container and when said outer skirt panel is not deflected rotation of said outer cap in said opposite direction will not impart rotation to said inner cap, said deflectable skirt panel being connected to said annular continuous and uninterrupted bottom edge, the inside of said annular continuous and uninterrupted bottom edge having a continuous inwardly extending lip which engages the bottom edge of the skirt of the inner closure cap to prevent separation of the inner cap relative to the outer cap.

3,888,376

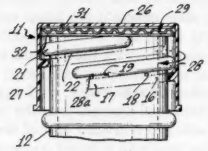
SAFETY CLOSURE CAP FOR CONTAINERS

Carl W. Cooke, Los Angeles, Calif., assignor to CWC Industries, Los Angeles, Calif.

Filed June 13, 1974, Ser. No. 479,044

Int. Cl. B65d *55/02, 85/56;* **A61j** *1/00*

U.S. Cl. 215—217 **8 Claims**



1. The combination of:

a container including a cylindrical neck having an open end;

a closure for said container having a top overlying said open end and a depending cylindrical skirt surrounding a portion of said neck adjacent said open end;

resilient sealing means carried by said closure and disposed between said top and said open end for sealing said open end;

continuous thread means carried on the exterior of said neck and the interior of said cylindrical skirt portion for engagement upon rotation of said closure to axially draw said closure into sealing relation with said open end, said thread means including;

cooperating locking means provided on said thread means of said neck and said cylindrical skirt adapted for inter-engagement when said closure is in sealing relation with said open end, said locking means on said thread means of said cylindrical skirt defining a portion of said thread means and being formed integrally therewith.

3,888,377

CLOSURE CAP FOR AN INFUSION FLASK

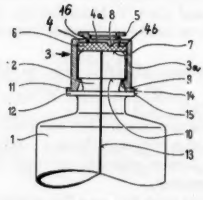
Reinhard Stadler, Karlsruhe, Germany

Filed May 14, 1974, Ser. No. 469,883

Claims priority, application Germany, May 30, 1973, 2327553

Int. Cl. B65d *47/36, 47/38, 41/50*

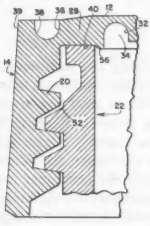
U.S. Cl. 215—249 **14 Claims**



1. A closure cap for application to the closed neck of an infusion flask to provide a sterile seal therefor, the cap comprising a skirt adapted to embrace the neck of the flask and an

end closure wall, a sealing disc cast or moulded in engagement with the inner face of the end closure wall, a tear-off cover portion integrally formed in the end closure wall whereby the sealing disc is exposed through the end closure wall when said cover portion is removed, and at least one projection on the inner face of said cover portion which locally reduces the thickness of the sealing disc for perforation.

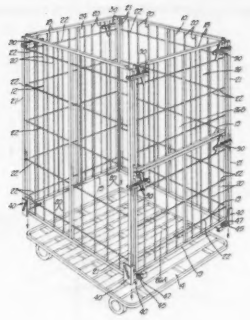
3,888,378
LINERLESS CLOSURE CAP
Richard G. Gerk, Palos Park, Ill., assignor to VCA Corporation, Baton Rouge, La.
Filed Sept. 19, 1973, Ser. No. 398,685
Int. Cl. B65d *53/02*
U.S. Cl. 215—344 **8 Claims**



1. A linerless closure cap formed of a plastic material and adapted for sealing engagement with an associated container in which the linerless closure cap comprises an end panel and a depending peripheral annular skirt, said peripheral skirt having means for securing the closure cap to a container, said end panel having an outwardly facing surface and an inwardly facing surface facing inwardly into said closure cap, said outwardly facing surface having an annular groove extending into said end panel and formed adjacent the peripheral edge but spaced therefrom and in substantial vertical alinement with the skirt to provide a second hinge means, said inner facing surface of said end panel having an annular sealing surface which is adjacent said annular skirt and extending inwardly and downwardly at an angle, another annular groove formed in the underside of said top end panel and extending into said end panel and facing inwardly in the direction of the interior of said closure cap to provide a first hinge means, said inwardly facing groove being adjacent the innermost portion of said annular sealing surface, said pair of hinge means permitting flexing of said end panel at said hinge means, said annular inclined sealing surface adapted when the closure cap is in sealing position to be compressed to assume a seal-tight engagement with the entire top edge of the container.

3,888,379
PALLET DISTRIBUTION CAGE
Fred G. Folberth, Stroudsburg, Pa., assignor to Banner Metals Division Intercole Automation, Inc., Compton, Calif.
Filed July 15, 1974, Ser. No. 488,736
Int. Cl. B65d *7/00*
U.S. Cl. 220—4 F **4 Claims**

1. A cage-like structure adapted to be removably secured to the peripheral edge of a rectangular pallet, said structure including: a pair of side panels spaced and parallel to one another; a pair of end panels spaced and parallel to one another; and a plurality of locking brackets secured to respective ones of said panels at the adjacent edges thereof, each of said locking brackets including an inclined clamp slide member secured to one of the panels, and a gravity clamp mounted in



sliding engagement with said clamp slide member and having a hooked end portion engaging the edge of the adjacent panel.

3,888,380
POLYEPICHLOROHYDRIN AEROSOL GASKETS
Joel A. Gribens, Framingham, and Gregory P. Cogliano, Canton, both of Mass., assignors to W. R. Grace & Co., Cambridge, Mass.
Division of Ser. No. 413,654, Nov. 7, 1973. This application July 25, 1974, Ser. No. 491,748
Int. Cl. B65d *7/34*
U.S. Cl. 220—81 R **1 Claim**

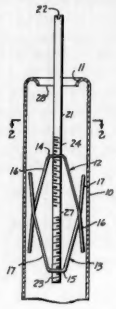
1. An aerosol can valve-mounting cup equipped with an annular gasket which has been deposited into the annular channel of the cup in the form of a solution of an amorphous polyepichlorohydrin elastomer having a molecular weight within the range of about 4,000 to about 20,000, the solution having been subsequently dried and the dry elastomer cured in situ at elevated temperature.

3,888,381
PROTECTIVE DEVICE FOR PREVENTING WITHDRAWAL OF LIQUID FROM A TANK
Wayne B. Russell, Jr., 3895 Lugo Ave., Lynwood, Calif. 90262
Filed May 17, 1974, Ser. No. 470,737
Int. Cl. B65d *25/02*
U.S. Cl. 220—86 AT **8 Claims**

1. A protective device for blocking a fill pipe of a liquid receptacle against insertion of an object comprising:
two spiders each having a central plate, the plates of the two spiders being arranged one above the other and spaced from each other;
a plurality of flexible legs extending outward from each plate and toward the other plate, the legs of the two plates being angularly spaced around the respective plate and being arranged in pairs;
interlocking means at the legs of each pair causing one leg of each pair to cross the other leg of the pair to interlock with said other leg of the pair at a position intermediate between the plates and the ends of the legs of the pair;
the upper one of the plates having a threaded hole through it and the lower one of the plates having a screw engaging means;
a threaded screw passing threadedly through the threaded hole of the upper plate and engaging the screw engaging means of the lower plate, said screw having a torquing means at its end above the upper plate;

the end section of each leg beyond the position of crossing the leg of the other of the pair being bendable at the position of crossing;

whereby turning the screw draws the plates toward each other, causing the inner sections of the spider legs located



between the respective plates and the crossing positions to move more nearly parallel to each other so that said crossing positions meet the wall of the pipe, and the end sections extend longitudinally along the pipe wall, thereby setting the protective device.

3,888,382

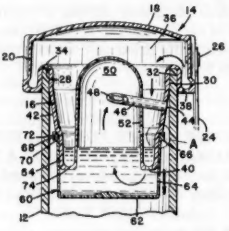
FILTER CAP CONSTRUCTION

Harold Blumhardt, Fredonia, N. Dak., assignor to Blumhardt Manufacturing, Inc., Ashley, N. Dak.

Filed Mar. 18, 1974, Ser. No. 452,274

Int. Cl. B65d *51/16*

U.S. Cl. 220—202 **12 Claims**



1. Cap apparatus for sealing a necked opening in a tank holding agricultural chemicals during field application comprising:

a. a unitary hollow cap defining a chamber therein, and having a plug portion with an outer surface, which plug portion extends a substantial distance into the neck during use, and an upper larger diameter portion extending outward of the neck during use, said plug portion also having a depression therein;

b. means defining a passageway from the outer surface of said plug portion to said depression;

c. a pair of orifices in said cap, a first one of which is placed in said plug portion below said passageway; and

d. cup means mating with said plug portion and, together with said depression, defining a chamber which communicates with the external surface of said plug portion by means of said passageway and with the atmosphere by means of said orifices.

3,888,383

CONTAINER HAVING A TAMPERPROOF CLOSURE

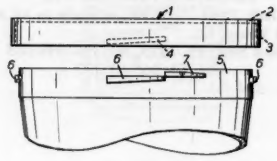
Martyn Rowlands, Epping, England, assignor to Bowater Packaging Limited, London, England

Filed Aug. 17, 1973, Ser. No. 389,313

Claims priority, application United Kingdom, May 7, 1973, 21582/73

Int. Cl. B65d *41/02, 41/32*

U.S. Cl. 220—265 **10 Claims**



1. An assembly comprising two elements, namely, a container and a closure cap for the container, wherein the cap and container are provided with at least one inwardly and at least one outwardly extending projection respectively which are engageable, by a relative turning movement in one sense between the cap and the container, to secure the cap on the container, and the cap and the container are each provided with a member, the two members being so arranged and constructed that, during the said relative turning movement, one member engages and rides across the other member and then disengages the other member, and that during relative turning movement in the opposite sense, one member so engages the other that continued relative turning movement in the said opposite sense in order to disengage the cap from the container is prevented unless one of the members becomes detached, in which assembly one of the two members is constituted by the projection or one of the projections on one of the elements.

3,888,384

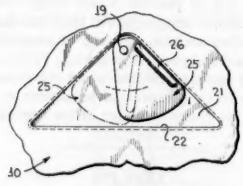
EASY OPENING END UNIT

James B. Novak, Glen Elly, Ill., assignor to Continental Can Company, Inc., New York, N.Y.

Filed May 17, 1974, Ser. No. 470,984

Int. Cl. B65d *41/32*

U.S. Cl. 220—268 **13 Claims**



1. An easy opening end unit comprising an end panel, a weakening line in said end panel, said weakening line defining a tear panel at least partially removable from said end panel, a rupture initiating member, means mounting said rupture initiating member for rotation relative to said end panel, end means for localizing rupturing forces of said rupture initiating member upon the rotation thereof contiguous said weakening line whereby severance of the latter is achieved to effect the at least partial removal of said tear panel from said and panel.

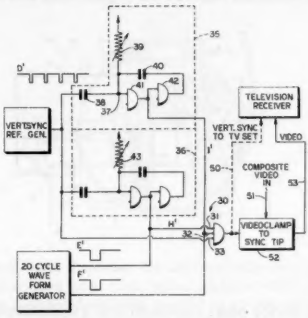
3,888,385
VERTICAL SYNCHRONIZATION TIME BASE ERROR CORRECTOR

Don J. Loughry, San Jose, Calif., assignor to Dart Industries Inc., Los Angeles, Calif.

Division of Ser. No. 234,022, March 13, 1972, Pat. No. 3,777,054. This application Mar. 8, 1973, Ser. No. 339,227The portion of the term of this patent subsequent to Dec. 4, 1990, has been disclaimed.

Int. Cl. H04m *1/22, 5/78*

U.S. Cl. 360—11 1 Claim



1. In a skip-two skip-field display sytem in which video fields are displayed by applying to a visual readout video intelligence and horizontal synchronizing signals from repetitive scanning of an odd field followed by video intelligence and horizontal synchronizing signals from repetitive triple scanning of an even field, the method of assuring continuity of horizontal synchronization and vertical synchronization of said readout, comprising the following stages:

providing vertical reference pulses at the standard cycle rate of N,

phase advancing the second scan in each series of three scans by a time equal to one-half horizontal line,

utilizing the second vertical reference pulse in each corresponding series for application to the readout,

generating pulses at N/3 rate in synchronism with the first scan in each series,

generating pulses at N/3 rate in synchronism with the third scan in each series,

utilizing the first vertical reference pulse and the first N/3 rate pulse in synchronism with the first scan to develop a first field delay pulse,

utilizing the third vertical reference pulse and the second N/3 rate pulse in synchronism with the third scan to develop a third field delay pulse, and

then utilizing the first field delay pulse and the third field delay pulse to slice the first and third vertical reference pulses in each corresponding series so as effectively to provide delayed vertical synchronizing pulses for application to the readout.

3,888,386
HINGE-LIKE DEVICE FOR CAPS OR COVERS

Harry Svensson, Loviselundsvagen 101, 162 35 Stockholm, Sweden

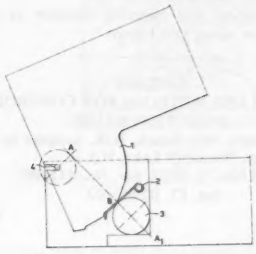
Filed May 3, 1974, Ser. No. 466,896

Claims priority, application Sweden, May 3, 1973, 061814/73

Int. Cl. B65d *43/24*

U.S. Cl. 220—335 1 Claim

1. A hinge-like supporting device for a horizontally arranged cover or the like, which is intended to be opened upwards around its back end, characterized by the fact, that a vertically located segment (1) substantially having the shape of a quarter of a complete circle and being attached to and extending downwards or alternatively backwards from the cover at said back end in a plane which is perpendicular to the rotation axis of the cover, and where the peripheral surface of the segment is formed in steps with two or more recesses, which at the movement of the segment around the rotation centre (4) of the cover is in steps influenced by a spring force



directed towards a point (A) in front of said rotation centre, so that the lever produced and the strength of the spring force will neutralize the weight of the cover at each step, whereby the cover will be retained at the opening angle relative to the horizontal plane corresponding to the position on the periphery of the segment of the recess (B) spring loaded at the respective moment.

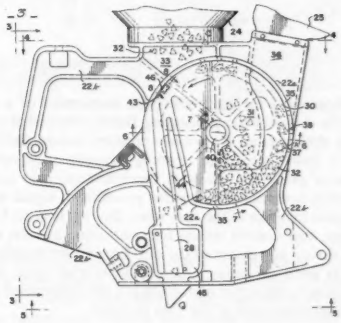
3,888,387
METERING APPARATUS FOR A SEED PLANTER

Harry C. Deckler, South Bend, Ind., assignor to White Farm Equipment Company, Cleveland, Ohio

Filed Oct. 12, 1973, Ser. No. 405,934

Int. Cl. B65g *29/00*

U.S. Cl. 221—278 23 Claims



1. In a seed planter for depositing seeds from a hopper into an underlying furrow at regular intervals, a seed metering apparatus, comprising, in combination:

a housing defining a chamber having an opening with margins lying in a single plane;

means comprising a drop chute for discharging seeds into said furrow;

gravity feed means for conveying seeds from said hopper to said chamber;

a disc shaped seed metering member having a flat inwardly-facing peripheral portion overlying said margins of said opening and having a plurality of pockets each dimensioned to receive a one or more of said seeds, said metering member being rotatably mounted so as to bring each of said pockets sequentially in communication with said chamber and said drop chute, and each of said pockets

being provided with a pressure-relief passageway communicating to the outside of said housing;

means for supplying pressurized air to said chamber to urge said seeds into said pockets;

means for at least substantially isolating said pockets from said pressurized air while said pockets are in communication with said drop chute to allow the seeds in said pockets to fall into said drop chute; and

means for rotating said metering member as said seed planter moves along said furrow.

3,888,388

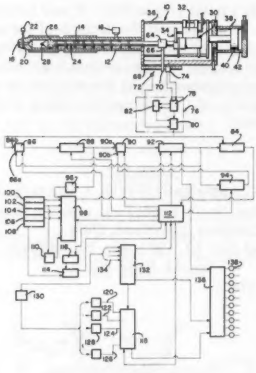
APPARATUS AND METHODS FOR CONTROLLING INJECTION RAMS

Francis E. Mahoney, Merrimack, N.H., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Nov. 1, 1973, Ser. No. 411,895

Int. Cl. B29f *1/02*

U.S. Cl. 222—1 **19 Claims**



1. Apparatus for controlling the movement of a ram disposed in a barrel for processing fluent material therein and axially driven from a variable position substantially spaced from a barrel discharge opening towards such opening to discharge processed material therethrough, said controlling apparatus comprising means for providing a signal indicating the actual location of the ram when the ram is in such variable position, and control means for controlling at least a portion of the driven movement of the ram from such variable position towards such discharge opening dependent upon said indicated ram location for maintaining a predetermined injection stroke displacement of the ram thereby.

3,888,389

FLOW CONTROLLER FOR FLOWING PRODUCTS, MORE PARTICULARLY, BULK MATERIALS

Hans Oetiker, St. Gallen, Switzerland, assignor to Gebruder Buhler AG, Switzerland

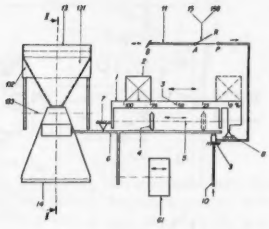
Filed Aug. 16, 1973, Ser. No. 388,783

Claims priority, application Switzerland, Aug. 23, 1972, 12498/72; Apr. 27, 1973, 6092/73

Int. Cl. G01d *11/08*

U.S. Cl. 222—23 **25 Claims**

1. In a flow controller for flowable products, particularly bulk materials, of the type having a closure member, of adjustable through-flow cross-section, arranged on a storage bin or a gravity discharge pipe, a regulating drive for regulating the through-flow cross-section, an inclined impact plate secured on a first lever arm of a balance beam in downwardly spaced relation to the closure member so that the impact force on the plate, due to deflection thereby of the product falling through a given distance, is proportional to the actual value of the flow rate of the product, expressed as quantity by weight per unit of time, the balance beam being pivotally connected intermediate its ends to a fixed frame and having at least one counterweight on a second lever arm remote from the impact plate, and an adjustable force-producing device acting on the balance beam in opposition to the impact force to regulate the through-flow cross-section with the deviation between desired value and actual value of flow rate of the product, resulting from the interaction between the impact force and the force-



producing device being converted into a corresponding positive or negative pressure signal serving as a regulating signal for the regulating drive: the improvement comprising, in combination, an auxiliary beam pivotally connected separately to said fixed frame; the adjustable force-producing device loading said auxiliary beam; and a supporting edge mounted on said auxiliary beam for adjustment longitudinally thereof, and engaging said second lever arm of said balance beam to transmit, to said second lever arm, a precisely balanced proportion of the load produced by said adjustable force-producing means, indicative of the desired value of flow rate of the product, acting in opposition to said impact force.

3,888,390

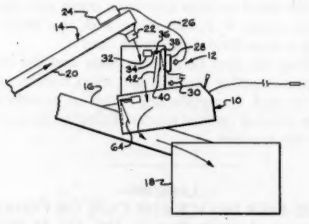
APPARATUS FOR METERING PARTICULATE MATERIAL

Theodore H. Grau, Sioux Rapids, Iowa, assignor to Toledo Stamping & Manufacturing Company, Toledo, Ohio

Filed June 17, 1974, Ser. No. 479,982

Int. Cl. B67d *5/06*, *3/00*

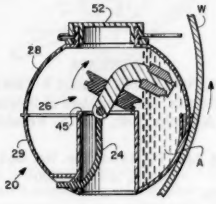
U.S. Cl. 222—28 **18 Claims**



1. Metering apparatus for metering a quantity of particulate material, said metering apparatus comprising a housing forming a bin for receiving the particulate material, said bin having a bottom wall defining an opening therein, a gate slidably mounted on said bottom wall in a position for reciprocation across said opening, a windshield wiper drive mounted on said bottom wall within said housing, said drive comprising a DC motor and a gear unit, said gear unit having a drive shaft extending therefrom through said bottom wall, means connecting said drive shaft and said gate to cause said gate to

reciprocate relative to said opening when said drive shaft is rotated, with said gate returning to a closed position closing off said opening when power to said motor is shut off.

3,888,391
DISPENSER FOR RINSE-WATER ADDITIVE
Theodore Paul Merz, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio
Filed Sept. 12, 1974, Ser. No. 505,308
Int. Cl. D06f *39/02*; B65d *47/14*
U.S. Cl. 222—52 **6 Claims**



1. A free-body dispenser for automatically mixing a predetermined volume of a rinse water additive with rinse water during an agitated deep rinse portion of an automatic cycle of a spin-dry type washing machine following a post-wash spin-empty portion of said cycle, said dispenser comprising:

a body having a substantially spherical-shape outer wall and an aperture through said outer wall;

a tubular member having a proximal end and a distal end, said proximal end being sealingly secured to an annular area of said outer wall surrounding said aperture so that said tubular member extends radially inwardly from said outer wall, said tubular member being of sufficient length so that said distal end is centrally disposed in said body; and

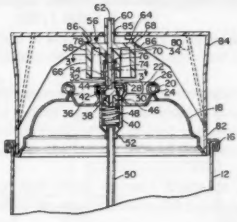
manually closeable, centrifugally openable valve means for keeping said distal end of said tubular member closed during said cycle until said dispenser is subjected to a predetermined contrifugal force during said spin-empty portion of said cycle, and for opening said distal end of said tubular member upon being subjected to said predetermined centrifugal force,

said body and said tubular member being sized and configured to accommodate said predetermined volume of additive within said dispenser while said valve means is open regardless of the orientation of said dispenser,

whereby said additive will be retained in said dispenser until flushed out by rinse water during said agitated deep rinse portion of said cycle.

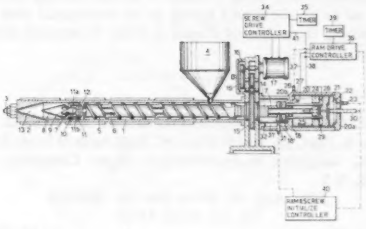
3,888,392
AEROSOL PACKAGE NOZZLE HAVING MEANS FOR REDUCING PRODUCT RETENTION THEREIN AND VALVE ACTUATOR
Robert H. Van Coney, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio
Filed Feb. 28, 1974, Ser. No. 446,836
Int. Cl. B67d *1/16*
U.S. Cl. 222—108 **12 Claims**

1. In an aerosol package comprising a pressurized can of liquid product provided with a valve having an elongated tubular stem extending generally vertically upwardly of the can wherein the valve is of a type to be moved relative, as by being depressed inwardly of, the can for actuation to dispense the product through such tubular stem, the improvement comprising an elongated nozzle carried by said stem having a bore extending generally longitudinally therethrough, one end portion of said bore providing a socket configured for secured mating insertion of the outboard end portion of said stem therewithin to define mounting means for said nozzle so that said nozzle moves with said valve for actuation thereof and dispensing of such product outwardly through said bore and



being provided with at least one groove therewithin for enabling draining of said bore downwardly outwardly past said stem to reduce retention of product within said bore when said valve is in the unactuated position thereof.

3,888,393
INJECTION MOLDER WITH RAM MOVABLE INDEPENDENTLY OF SCREW FEEDER
Mordeki Drori, 89 Zahal St., Kiron, Israel
Filed Jan. 22, 1974, Ser. No. 435,528
Int. Cl. B29f *1/04*
U.S. Cl. 222—229 **10 Claims**

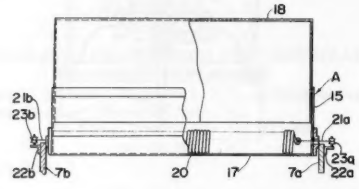


1. An injection unit particularly for injection moulding machines, comprising: a barrel carrying an injection nozzle at one end; a feeding device feeding the material to be injected into the barrel and towards the nozzle end thereof; a ram including a head and a drive shaft axially movable within the barrel independently of the feeding device for injecting the material through the nozzle; said feeding device being a screw feeder rotatable within said barrel independently of and coaxial with the ram; a partition member disposed within the barrel at the nozzle end thereof between the feeding device and the ram head and dividing the nozzle end of the barrel into a filling chamber for receiving the material from the feeding device, and an injection chamber for injecting the material through the nozzle by the ram head; said partition member including a passageway establishing communication between the filling chamber and injection chamber; and a valve member actuated to close said passageway upon the forward, injection movement of the ram head towards the nozzle, and to open said passageway to establish communication between the filling chamber and the injection chamber upon the return movement of the ram head away from the nozzle.

3,888,394
TONER DISPENSING DEVICE

Susumu Tanaka; Yuji Enoguchi, and Hidetoshi Kawabata, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka 541, Japan

Filed May 20, 1974, Ser. No. 471,779
Claims priority, application Japan, May 28, 1973, 48-62561
Int. Cl. G01f 11/00
U.S. Cl. 222—230 6 Claims

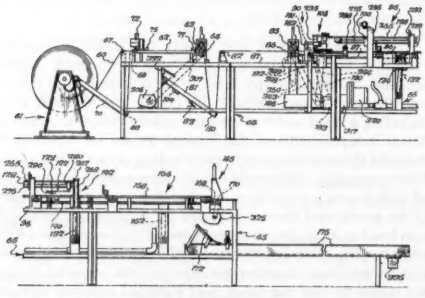


1. In a toner dispensing device for use in a developing apparatus of an electrostatic copying machine which comprises a dispenser casing retained in an opening formed on a wall of said developing apparatus, said dispensing casing having a slit formed in a bottom portion thereof, a container for toner powder removably received in and communicating with said dispenser casing, and a coil spring provided at the bottom of said dispenser casing above said slit with neighboring turns of said spring adapted to contact with each other in the contracted state of said spring, an improvement thereof for feeding toner powder uniformly and positively which comprises means for pulling one end of said spring for expansion thereof so that gaps are formed between said neighboring turns of said spring for toner powder to pass through said gaps and said slit, said pulling means being adapted to release pulling intermittently so as to allow said spring to be contracted with said neighboring turns thereof closed in order to suspend feeding of toner powder.

3,888,395
MACHINE FOR HANDLING SHEET MATERIAL

George A. Burt, Jr., and William M. Neill, both of Santa Clara, Calif., assignors to International Paper Company, New York, N.Y.

Filed Aug. 16, 1973, Ser. No. 388,813
Int. Cl. A41h 43/00
U.S. Cl. 223—1 31 Claims

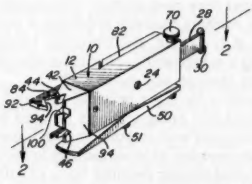


1. In a machine for moving, folding and cutting sheet material, comprising, in combination:
a source of flexible sheet material;
means for receiving a web of material from said source and directing the same along a feed path, the receiving means including first drive means including a first pair of rollers for advancing the web along its path;
edge folding means disposed along the feed path for turning over the longitudinal edges of the web to form a narrow fold along each of said edges;
a cutting mechanism positioned along the feed path for dividing the thus folded web into successive sheets, the cutting mechanism having a second pair of rollers and cutting means carried by one of the rollers in the second pair for severing the web along a straight line which extends in a direction transverse to the web's direction of movement along the feed path; and
second drive means interposed between the first drive means and the cutting mechanism for advancing the web thereto.

3,888,396
SEWING MACHINE NEEDLE THREADER

Lawrence S. Liebrecht, deceased, late of Delphos, Ohio, and by Francis M. Liebrecht, heir, 428 S. Franklin St., Delphos, Ohio 45833

Filed Apr. 16, 1974, Ser. No. 461,458
Int. Cl. A41h 31/00
U.S. Cl. 223—99 6 Claims

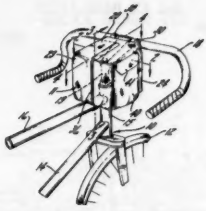


1. A needle threader for a sewing machine needle, said threader including body means defining a first elongated substantially straight and laterally outwardly opening groove, said body means including abutment means registered with one end of said groove and adjustably shiftable lengthwise thereof, said abutment means being adapted to have the pointed end of a needle seated in said groove abutted thereagainst for adjustably longitudinally positioning said needle in said groove, said body means also including means defining a second elongated substantially straight and laterally outwardly opening groove disposed at generally right angles relative to and including a longitudinal mid-portion intersecting with a longitudinal mid-portion of said first groove and with said first and second grooves opening laterally outwardly in substantially the same direction, said direction disposed generally normal to said plane, and an elongated blade portion having one terminal end thereof, having major and minor cross-sectional dimensions disposed at generally right angles relative to each other, supported from said body for guided longitudinal oscillation back and forth transversely through the intersecting portions of said grooves along a path generally paralleling said direction, said terminal end being disposed with its major cross-sectional dimension extending along said first groove for projection of said terminal end through the eye of a needle seated in said first groove, having its pointed end abutted against said abutment means and having its eye generally centered on said path, and cam means shiftably supported from said body for movement between a first retracted position to one side of said first groove and a second operative position extending across said first groove with a portion thereof projecting into said first groove from the open side thereof.

3,888,397
BICYCLE BAG

Edward S. Koizumi, 2446 N. Geneva Ter., Chicago, Ill. 60614

Filed July 26, 1973, Ser. No. 382,965
Int. Cl. B62j 7/06
U.S. Cl. 224—35 4 Claims

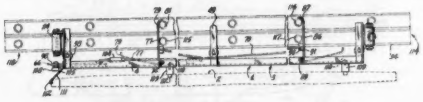


1. A carrying bag for a bicycle having a frame with a forwardly angled stem supporting a handlebar, said bag comprising front, rear, top, and bottom pnales with a pa.. of interconnecting side panels, said panels defining an interior storage area, said bottom panel being formed with a central front opening V-notch, and said front panel being formed with a recessed section comprising a pair of walls extending upwardly from the sides of the bottom panel V-notch to an elevation slightly below the top panel so as to define a central internal partition separting the interior storage area of the bag into two distinct compartments, said recessed central portion of the front panel of the bag and said central opening V-notch in the bottom panel of the bag thus forming a pocket to receive the angled handlebar support stem of the bicycle said bag being attached to and retaining said stem in said V-notch by a releasable, means on said front panel for releasably securing said bag to said handlebars on the rider's side of said handlebars with said front panel adjacent said handlebar, means on said bottom panel for securing said bag to a bar of the bicycle frame, and means in said top and rear panels for permitting selective access to the interior compartments of said bag.

3,888,398
LADDER RACK

Earl E. Payne, R.D. No. 2, Box 91, Blairsville, Pa. 15717

Filed Feb. 12, 1968, Ser. No. 704,629The portion of the term of this patent subsequent to Sept. 1, 1987, has been disclaimed.
Int. Cl. B60r 9/04
U.S. Cl. 224—42.1 9 Claims



1. A roof rack for a vehicle to support and retain a ladder having side rails and rungs on the vehicle during normal travel of the vehicle comprising, in combination

an elongated frame comprising

spaced apart side members, and

cross members extending between and secured to said side members;

means securing the frame on the roof of a vehicle;

a plurality of support rollers

means mounting said rollers on said frame for rotation about axes spaced apart longitudinally of said frame, whereby a ladder on said rack engages said support rollers and is supported in spaced relation to the roof of the vehicle;

clamp means to secure a ladder to said frame, said clamp means being connected to said frame and including a first arm and a second arm,

said arms each having an arcuately curved ladder rung engaging portion;

mounting means mounting said first and second arms for pivotal m ment in opposite directions about spaced apart axes,

to a first position in which said rung engaging portions are between a ladder on the rack and the roof of the vehicle, and

to a second position in which said arms extend between rungs of the ladder and said curved portions each engage a different rung of the ladder and exert force on the rungs to urge the ladder toward the support rollers;

a lever;

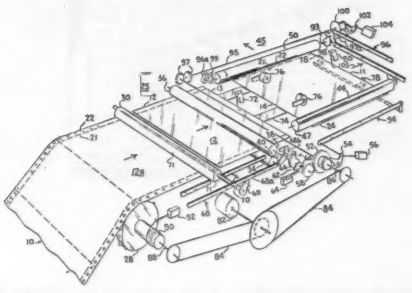
means mounting said lever on said frame at a location readily accessible for manipulation by a person adjacent the vehicle; and

linkage means interconnecting said lever and said first and second arms, said linkage means connecting said arms for simultaneous movement, one toward the other, during manipulation of said lever to move said arms from said first to said second positions.

3,888,399
BURSTING APPARATUS

Walter J. Hanson, Old Greenwich, and Eriks Parups, Norwalk, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Oct. 31, 1972, Ser. No. 302,607
Int. Cl. B26f 3/02
U.S. Cl. 225—106 5 Claims



1. A bursting apparatus for separating a continuous series of forms having perforation lines therebetween into individual forms: comprising

A. feed means for intermittently advancing said continuous series of forms;

B. clamping means having a clamping condition for holding said continuous series of forms immobile and a release condition for allowing feed movement of said continuous series of forms;

C. actuating means for said clamping means;

D. burster roller means adapted when operated to apply a feed tension force to the leading form in said series of forms;

E. drive means for rotating said burster roller means; and

F. control means for controlling the operation of said clamp actuating means and said burster roller drive means to cause said burster roller means to apply a tension feed force to the leading form in said series while said clamping means is clamping the next form following said lead form in said series whereby said lead form may be separated from the remaining forms in said series;

G. said actuating means for said clamping means including a movable bar member and means for moving said bar

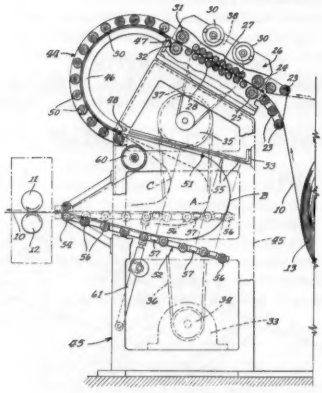
between clamping and release positions, said bar member having an operative longitudinal edge that serves to operate said clamping means for any form length adjusted position of said clamping means along the length of said bar member.

3,888,400

LOOP CONTROL APPARATUS FOR CONTINUOUS STRIP MATERIAL

Chester M. Wiig, Lincolnwood, Ill., assignor to F. J. Littell Machine Company, Chicago, Ill.

Filed Mar. 28, 1974, Ser. No. 455,567
Int. Cl. B65h *25/32*
U.S. Cl. 226—43 **3 Claims**



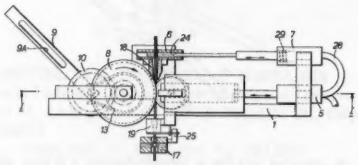
1. In loop control apparatus of the character described, in combination, a pair of feeding rolls having rotation for feeding continuously a strip of stock material, a second pair of feeding rolls spaced from the first mentioned pair and adapted to have intermittent rotation for advancing the strip material in an intermittent manner, loop forming structure located between the first and the second pair of feeding rolls and having operation to produce a pair of loops in the strip material approximately equal in size and which are formed in opposed relation whereby to simulate the letter S, said loop forming structure including first loop forming means and a pair of spaced platforms between which the second loop is formed, the loop forming means essentially consisting of a semi-circular frame member having a plurality of idler backing rollers journalled thereby and against which the strip material is caused to contact to thus form said first loop, the idler backing rollers being disposed transversely of the strip material and being spaced along the length of the first loop, the bottom platform of said spaced platforms also journalling a plurality of idler rollers against which the bottom part of the second loop is caused to engage, and loop-size detecting means carried by the platforms including a plurality of detecting units for detecting the size of the second loop and for controlling the speed of the first pair of feeding rolls accordingly.

3,888,401

FILAMENT FEEDING APPARATUS

Anthony William Minall, and Edmond Thomas Palmer, both of Portsmouth, England, assignors to J. Evans & Son (Portsmouth) Limited, Portsmouth, England

Filed Mar. 8, 1974, Ser. No. 449,559
Claims priority, application United Kingdom, Mar. 20, 1973, 13351/73
Int. Cl. B65h *17/22*
U.S. Cl. 226—109 **9 Claims**



1. Apparatus for feeding brush-filling material to a brush-filling tool comprising in combination

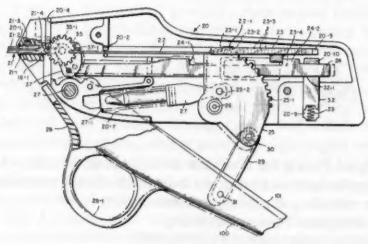
1. a feed roller means with at least two separate circumferential material feed paths thereon,
2. drive means for rotating the feed roller a predetermined amount in a feeding direction,
3. at least two idler rollers each positioned to engage a different one of the feed paths to hold feed material in frictiional engagement with the feed roller when that material is to be fed,
4. means for selectively moving each roller into and out of engagement with the feed paths so as to feed material thereon, and
5. braking means for restraining movement of material when not being fed.

3,888,402

FEED MECHANISM FOR DISPENSING APPARATUS

Arnold R. Bone, Needham, Mass., assignor to Dennison Manufacturing Company, Framingham, Mass.

Filed Nov. 21, 1973, Ser. No. 418,046
Int. Cl. B65h *17/22*
U.S. Cl. 226—157 **15 Claims**

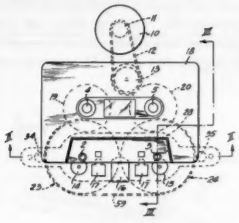


1. In an apparatus for dispensing fastener attachment members or the like including means for forcing a portion of a fastener attachment member through a hollow slotted means or the like, and an indexing mechanism including an indexing wheel having a plurality of teeth, the improvement in the indexing mechanism comprising means for urging rotation of said wheel more than one tooth each time it is rotated.

3,888,403
TAPE DRIVE SYSTEM

Kenji Yoshida, Tokyo; Tetsuo Sekiya, Yokohama, and Toyokazu Higo, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Nov. 20, 1973, Ser. No. 417,504
Claims priority, application Japan, Nov. 24, 1972, 47-117843
Int. Cl. B65h *17/22*
U.S. Cl. 226—188 **7 Claims**

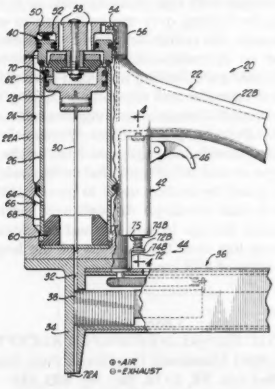


1. A magnetic recording and/or reproducing apparatus comprising, a pair of capstans mounted on a mounting plate for transporting a tape in a predetermined direction in cooperation with a pinch roller, means for driving said pair of capstans, at least one of said driving means comprising a drive motor having an outer rotor secured to a rotor shaft of said motor, said rotor shaft acting directly as said capstan, axially spaced bearing means supporting said shafts and means for forming said mounting plate and all bearing members supporting said rotor shafts and their capstans for rotation in permanent rigidly fixed relation in integral mono-block.

3,888,404
SAFETY FOR FASTENER DRIVING TOOL

Howard B. Ramspeck, Chicago, and Raymond F. Novak, Schiller Park, both of Ill., assignors to Duo-Fast Corporation, Franklin Park, Ill.

Filed Sept. 13, 1973, Ser. No. 397,021
Int. Cl. B25c *1/04*
U.S. Cl. 227—8 **14 Claims**

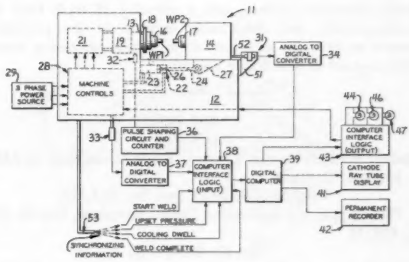


1. A tool for driving fasteners into a workpiece comprising a powered fastener driving assembly including a driver element actuated by a drive piston movable within a cylinder,
a fluid controlled main valve means opened to supply pressurized fluid to and closed to exhaust fluid from the cylinder,
a fluid controlled cycle valve coupled to the main valve means and movable to alternate positions to control opening and closing of the main valve means,
a first control means coupled to the cycle valve including a valve controlled by independently operable manual means and safety means actuated by placing the tool adjacent the workpiece for moving the cycle valve to a position effecting opening of the main valve means only when both of the manual means and the safety means are actuated,
and a second control means coupled to the cycle valve and responsive to the operation of at least one of the manual means and safety means for preventing movement of the cycle valve when the manual means is operated prior to the safety means.

3,888,405
QUALITY CONTROL APPARATUS FOR INERTIAL WELDING

Thaddeus M. Jones, South Bend, Ind.; Jozef Kiwalle, Moylan, Pa., and Ernest J. Ruder, Pekin, Ill., assignors to Production Technology Inc., Peoria, Ill.

Continuation-in-part of Ser. No. 286,312, Sept. 5, 1972, abandoned. This application May 30, 1974, Ser. No. 474,844
Int. Cl. B23k *27/00*; G05b *13/00*; G05f *15/46*
U.S. Cl. 228—2 **9 Claims**

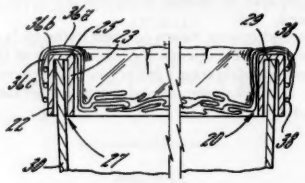


1. Quality control apparatus in combination with a friction welding machine including a spindle means for relatively rotating two workpieces and hydraulic ram means for pressing the two workpieces into engagement at a common interface, the friction welding machine including an inertial mass operatively coupled for rotation with one of the workpieces to provide substantially all energy consumed at the interface of the workpieces, comprising
separate transducer means for respectively monitoring the conditions of relative rotating speed of the workpieces, fluid operating pressure in the hydraulic ram means and axial upset at the interface of the two workpieces,
computer means coupled with the separate transducer means by converter and input interface logic means to analyze representative signals from the separate transducer means,
signal means coupled with the computer means by output interface logic means for providing a substantially instantaneous signal corresponding to each of the monitored conditions, and
control means for automatically conditioning the welding machine to repeat a weld cycle, the control means being coupled with the output interface means to terminate operation of the machine when one of the monitored conditions in outside an acceptable range.

3,888,406
TRASH DISPOSAL APPARATUS

J. Timothy Nippes, 33 Maryland Ave., Annapolis, Md. 21401

Filed Jan. 2, 1973, Ser. No. 320,574
Int. Cl. B65d 5/60
U.S. Cl. 229—14 R 7 Claims

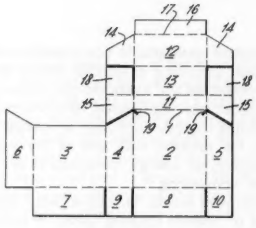


1. Trash disposal apparatus suitable for attachment to a frame assembly for providing a receptacle for use in the collection of trash, said trash disposal apparatus comprising support means adapted to be positioned upon the upper portion of the frame assembly and suitable for carrying a plurality of trash liner bags; a plurality of attachment means located on the periphery of the support means and separated into spaced groups each of which group is positioned for respectively carrying one of a plurality of trash liner bags in an opened-top, trash receptive manner; and a plurality of trash liner bags independently and detachably secured to the attachment means so as to be positionable in a trash receiving manner with respect to said frame assembly.

3,888,407
PACKETS

Robert William Davies, London, England, assignor to Molins Limited, England

Filed May 4, 1973, Ser. No. 357,116
Claims priority, application United Kingdom, May 8, 1972, 21455/72
Int. Cl. B65d 5/66
U.S. Cl. 229—44 CB 11 Claims

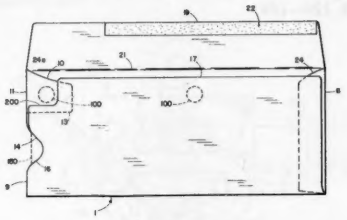


1. A blank for a hinged lid packet having a body portion and a lid portion, said body portion comprising a back panel connected along a hinge line to said lid portion, a front panel having a height smaller than said back panel, a first side panel connecting one side of said front panel to one side of said back panel, a second side panel having the same width as said first side panel and connected to the other side of the said front panel, and a third side panel connected to the other side of said back panel and adapted in the erect packet to underlie and be secured to the inside of said second side panel, the top edge of each side panel being inclined so that in the erect packet the top edge of said side panel slopes from said back panel down to said front panel.

3,888,408
EASILY OPENABLE ENVELOPE

George R. Clipner, c/o Service Envelope Co., 11 Lincoln St., Kansas City, Kans. 66103

Filed May 25, 1972, Ser. No. 256,682
Int. Cl. B43m 5/00
U.S. Cl. 229—85 4 Claims



1. An easily openable envelope for an enclosure, said envelope including generally rectangular panels overlying each other and interconnected along two adjacent edges of said panels to close two adjacent sides of said envelope to provide a pocket provided between said panels, one of the other two remaining edges of said envelope having between said panels a closeable insert opening through which an enclosure can be placed in said pocket, the other one of the remaining edges of said envelope having between its panels a withdrawal opening from which said enclosure can be subsequently withdrawn, a tab extending from a side edge portion of one panel across said withdrawal opening for holding contents in said envelope, said tab having a fold extending across the closing a portion of the withdrawal opening and positioning a portion of said tab in face-to-face contact with the inside of the other panel, said fold and the side edges of both panels being substantially in alignment, said tab being sufficiently flexible and the contacting faces of said tab and of said other panel being at least substantially unattached so that the withdrawal of said enclosure of said envelope through said withdrawal opening can be done by an operator without a rupturing of said tab into two part because said tab will unfold as an abutting edge of said enclosure presses against said tab during said withdrawal, a closure flap integral with one of said panels at the closeable insert opening for folding over the enclosure to engage the other of said panels, the remainder of said withdrawal opening being open so an operator can grasp said contents therethrough, said other panel having a suction element receiving means disposed opposite and exposing a lapping portion of said tab, said suction element receiving means being of substantial size for permitting an annular suction element of a content insertion machine to engage said tab on the same side of said envelope as said other panel for pulling said tab away from said one panel by suction so as to permit said contents to be placed in said envelope through said insert opening without excessive damage to said tab and envelope, said tab extending across less than the majority of the length of the adjacent side edge of said envelope.

3,888,409
AUTOMATIC SIGNAL NEWSPAPER RECEPTACLE

Leo J. Bolduc, 9861 Monument Dr., Grants Pass, Oreg. 97526

Filed Jan. 14, 1974, Ser. No. 433,226
Int. Cl. A47g 29/12
U.S. Cl. 232—1 C 4 Claims

1. A signal newspaper delivery receptacle, comprising, in combination:

a. a receptacle arranged for the delivery of a newspaper; and provided with an inlet opening for the newspaper; and

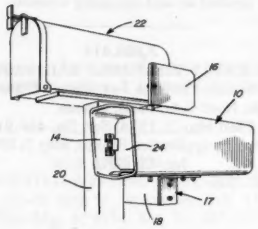
b. means for indicating the presence of a newspaper in the receptacle; the means for indicating including, in combination:

i. a door;

ii. means for pivotally mounting the door adjacent the receptacle inlet opening for swinging movement between a position transverse of the receptacle and a position directed into the receptacle under pressure from an article inserted in the receptacle;

iii. an indicator connected to the door for movement therewith, and arranged outside the receptacle; and

iv. means for releasably retaining the door in a position blocking the inlet opening, the receptacle being normally disposed horizontally and extends longitudinally, the inlet opening forming one longitudinal end of the



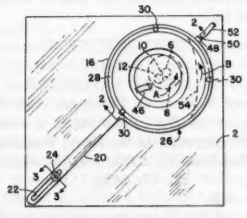
receptacle, and the door being a plate dimensioned to block substantially the entire inlet opening, the means for mounting including a shaft of substantially rectangular cross section, opposed holes provided in top and bottom walls of the receptacle and arranged adjacent and substantially parallel to a common side wall and the inlet opening thereof for pivotally receiving the shaft, the plate retained on the shaft, the indicator being a further plate forming a flag and having two bends made along one edge of the further plate to form a generally U-shaped channel dimensioned for mating with the shaft, the further plate retained on the shaft at right angles with respect to the door, and a collar arranged on the shaft between the further plate and the top wall of the receptacle for forming a bearing which facilitates pivotal movement of the shaft.

3,888,410

FLUID CONTROL APPARATUS AND METHOD

Charles W. McKee, Seaford, Va., assignor to United States Government National Aeronautics and Space Adm., Office of General Counsel-Code GP, Washington, D.C.

Filed Nov. 30, 1973, Ser. No. 420,424
Int. Cl. B04b *1/16*
U.S. Cl. 233—6 **4 Claims**



1. Apparatus for controlling fluids comprising:

base means;

a circular container having an outer peripheral wall;

drive means movable in an orbital path in a plane substantially parallel to the plane formed by the diameters of said circular wall including a rotating shaft, crank arm and crank pin;

means drivingly connecting said drive means to said container comprising a support plate fixedly attached to said container and journaled to said crank pin;

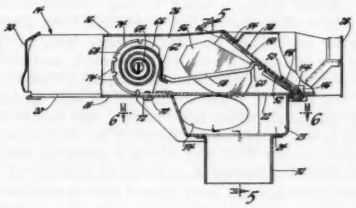
orienting means preventing rotation of said container due to the influence of said drive means, thereby causing said container to gyrate about said orbital path while remaining in substantially fixed orientation relative to said base means, comprising a stationary pin fixedly attached to said base means and an elongated slot in said support plate, generally radial to said crank pin, slidably engaging said stationary pin whereby any liquid in said circular container is forced against and moves tidally around the radial extremities of the inside of the outer peripheral wall of said container as a result of centrifugal force generated by the orbital motion of said container.

3,888,411

ENGINE INDUCTION AIR FLOW CONTROL

Robert T. Florine, Flint, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Sept. 3, 1974, Ser. No. 502,653
Int. Cl. G05d *23/08*
U.S. Cl. 236—13 **3 Claims**

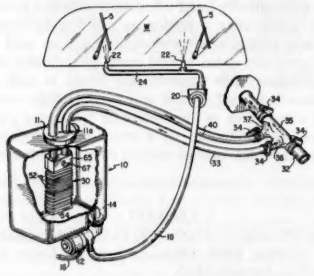


1. An internal combustion engine induction air flow control comprising a conduit for air flow to the engine, said conduit having a primary inlet for air at ambient temperature and an auxiliary inlet downstream of said primary inlet for heated air, an air flow damper assembly, a pivot pin mounting said damper assembly in said conduit for pivotal movement between a first position obstructing flow through said primary inlet while permitting flow through said auxiliary inlet and a second position permitting flow through said primary inlet while obstructing flow through said auxiliary inlet, said damper assembly including guide and damper members independently pivoted on said pin and spring means biasing said members for concomitant movement, temperature responsive means disposed in said conduit downstream of said inlets and having an arm connected to said guide member, said temperature responsive means biasing said damper assembly toward said first position at air flow temperatures below a selected value and permitting movement of said damper assembly to said second position at air flow temperatures above the selected value and further positioning said damper assembly intermediate said positions to maintain air flow temperature at the selected value, said damper member being movable toward said second position against the bias of said spring means independently of said guide member by air flow above a selected rate to increase the flow of ambient temperature air for maximum efficiency.

3,888,412
APPARATUS FOR HEATING THE FLUID IN A WINDSHIELD WASHER SYSTEM

Herbert Lindo, Mineola, N.Y., assignor to Kenilworth Research & Development Corporation, Mineola, N.Y.

Filed Apr. 17, 1973, Ser. No. 352,009
Int. Cl. B60h *1/06*
U.S. Cl. 237—12.3 B 10 Claims



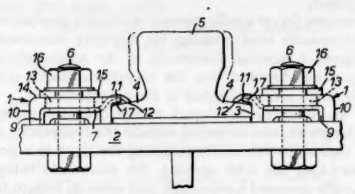
1. Apparatus for heating fluid in a windshield system of a motor vehicle having a liquid cooling system including a heater line in which the cooling system fluid flows, comprising a reservoir for holding windshield washer fluid, an opening formed in a portion of a wall of said reservoir, heat exchanger means comprising a heat exchanger housing of closed configuration and being of a size to fit through said opening and located completely within said reservoir, said heat exchanger housing having extending fin members for immersion in the windshield washer fluid and having a generally serpentine internal fluid flow passage therein with an inlet and an outlet, said heat exchanger also being formed with an open section in communication with the inlet and outlet of said fluid flow passage, a pair of nipples located in said housing open section in fluid flow communication respectively with the inlet and outlet of said fluid flow passage, a respective hose extending through said reservoir opening and attached to each of said nipples, cover means fastened to said heat exchanger housing at said open section and engaging said hoses to hold them in fixed relationship with the heat exchanger housing, and means for coupling said hoses to the cooling system heater line of the vehicle to bypass a portion of the cooling system fluid through the fluid flow passage of the heat exchanger and back to the cooling system.

3,888,413
RAIL ANCHORAGE PROVIDED WITH A RESILIENT CLAMPING ELEMENT

George Molyneux, Gloucester, England, assignor to Molyneux Rail Clips Limited, Gloucester, England

Filed Apr. 15, 1974, Ser. No. 461,124
Int. Cl. E01b *9/34*
U.S. Cl. 238—349 8 Claims

1. A flanged-rail anchorage, for securing to a support at one side of a rail having a flange, comprising a base adapted to be secured to the support, a resilient clamping element held by the base, a part of said element projecting beyond the base and having a lower surface to locate over and in contact with the flange of the rail, and an integral ear on said base extending on either side and in the same direction as the projecting part of said element, each ear having a lower surface positioned above the lower surface of said projecting part, so as to be able to extend over and only to engage with the rail flange

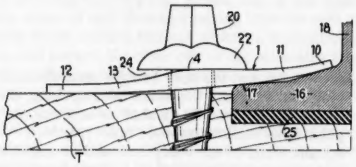


if the rail is significantly distorted, so as to prevent excessive stress being applied to said clamping element.

3,888,414
RESILIENTLY YIELDABLE RAIL FASTENING

Michel Duchemin, Lambres Les Douai, France, assignor to Ressorts du Nord S.A., Paris, France

Filed May 3, 1974, Ser. No. 466,919
Claims priority, application France, May 3, 1973, 73.15918
Int. Cl. E01b *9/30*
U.S. Cl. 238—349 12 Claims



1. A fastening device for fastening to a railway tie a rail which has a flange and is supported by the tie through an elastically yieldable pad, comprising : a fastening comprising at least one resiliently yieldable plate bearing, in a first branch adjacent one end of the fastening at at least one point of the fastening, against the tie and, in a second branch adjacent an opposite end of the fastening at at least one point of the fastening, against the flange of the rail, means defining in the plate an aperture, between the two branches, the fastening having a thickening in a centre part of the fastening in the region of the aperture constituting a curved boss, the fastening progressively thinning down from the boss in directions toward said ends of the fastening; and tightening means for tightening down the fastening onto the rail flange extending through the aperture and connected to the tie, the tightening means being pivotally engaged with the upper face of the boss at a contact point located between a region in which the fastening bears against the tie and a region in which the fastening bears against the flange of the rail, whereby said fastening pivots around said contact point as the pad is compressed or depressed by the rail.

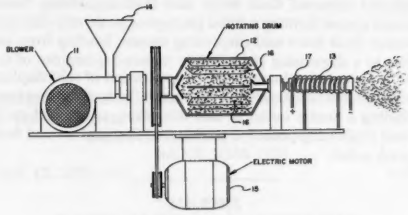
3,888,415
PARTICLE VAPORIZER

Irwin Koff, and William G. Finnegan, both of China Lake, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 27, 1974, Ser. No. 483,862
Int. Cl. A01g *15/00*
U.S. Cl. 239—2 R 2 Claims

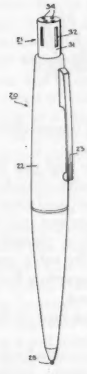
1. In a method for dispersing weather modification nuclei wherein a weather modification material is changed from one physical form to another, dispersed into the atmosphere and allowed to reconstitute itself into said nuclei, the improvement

residing in blowing discrete solid particles of said weather modification material into an electrically heated tube, vaporizing said weather modification material within said tube and



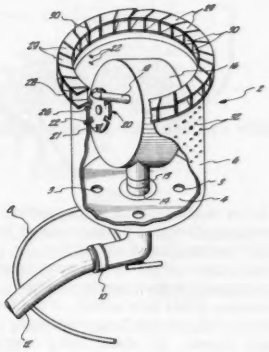
dispersing the vapor formed within said tube from said tube into the atmosphere where it reconstitutes itself into said nuclei.

3,888,416
SCENTED WRITING INSTRUMENT
A. Oscar Lin, 42-06 66th St., Woodside, N.Y. 11377
Filed May 6, 1974, Ser. No. 467,377
Int. Cl. A24f *25/00*; A61l *9/04*
U.S. Cl. 239—34 **19 Claims**



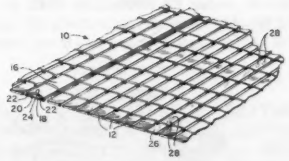
1. In combination,
a writing instrument including a housing, a retractable writing means at one end of said housing and a plunger at an opposite end of said housing for moving said writing means within said housing; and
a vapor dispenser mounted on said plunger and extending from within said housing at said opposite end, said dispenser including a container for holding a supply of vaporizable material, said container having at least one opening therein to allow a flow of vapor therethrough, and a cover rotatably mounted about said container and having at least one opening therein for registering with said opening in said container upon rotation of said cover into predetermined positions relative to said container.

3,888,417
VARIABLE WATER VOLUME SPRINKLER
Al Harmon, 1548 East Altadena Dr., Altadena, Calif. 91001
Continuation-in-part of Ser. No. 287,511, Sept. 8, 1972, abandoned. This application Oct. 1, 1973, Ser. No. 402,103
Int. Cl. B05b *3/00*
U.S. Cl. 239—97 **31 Claims**



1. A water sprinkler assembly for delivering a variable volume of water comprising:
at least one nozzle adapted to emit water from a constant source of water and mounted for rotational movement;
means for applying a constant rotational force to the nozzle; and
timing means for intermittently holding the nozzle stationary against the constant rotational force to vary the total volume of water emitted in a particular direction including a movable timing member and a plurality of relatively stationary members that are capable of restraining the co-ordinate movement of the timing member and the nozzle.

3,888,418
DEVICES, SYSTEMS AND METHODS EMPLOYING KNITTED FABRIC MULCH
Robert T. Seith, Tuscaloosa, Ala., and Otto M. Bundy, Bradenton, Fla., assignors to Gulf States Paper Corporation, Tuscaloosa, Ala.
Division of Ser. No. 333,782, Feb. 20, 1973, Pat. No. 3,848,359. This application Aug. 12, 1974, Ser. No. 496,753
Int. Cl. A01g *27/00*
U.S. Cl. 239—145 **9 Claims**

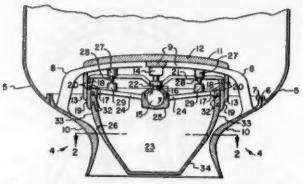


1. A mulch comprising an open-mesh knitted fabric constituted by a multiplicity of knittedly interconnected longitudinal and transverse yarn elements, said fabric having at least one irrigation tube between longitudinal yarn elements and interleaved with transverse yarn elements of said fabric, said irrigation tube being substantially wider than said yarn elements.

3,888,419
SPIKE NOZZLE FOR ROCKETS

Edward E. McCullough, and E. Eugene Anderson, both of Brigham City, Utah, assignors to Thiokol Corporation, Bristol, Pa.

Filed Sept. 13, 1971, Ser. No. 179,790
Int. Cl. B63h *11/10*
U.S. Cl. 239—265.19 **4 Claims**

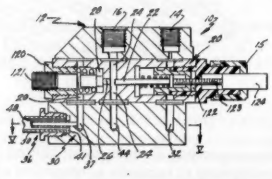


1. A thrust nozzle for rockets comprising:
a convergent-divergent nozzle member having attachment means for attaching it to a rocket:
a spider support fixed to the convergent portion of the convergent-divergent nozzle member;
an insulating shield substantially in the form of a disk with a peripheral, annular flange extending aftwardly at right angles thereto, the shield being centrally fixed to the forward side of the spider support, the arms of which extend in sealed relationship, through the aftwardly-extending flange;
a primary, fluid-operated actuator, having an actuation arm, centrally fixed to the spider support and extending aftwardly;
a univrsal joint fixed to the actuation arm;
a spike nozzle member fastened on the universal joint and extending aftwardly in the throat portion of the convergent-divergent nozzle member, whereby it may form an annular throat therewith that may be varied in size as the spike nozzle member is moved axially relative to the convergent-divergent nozzle member by the first actuator;
a secondary fluid-operated actuator fixed to an arm of the spider support, spaced from the center therof, extending aftwardly, and having an actuation arm in contact with the spike nozzle member, whereby it may rotate the spike nozzle member about the universal joint; and
sealing means between the spike nozzle member and the flange of the insulating shield to prevent hot, propulsive gases of the rocket from entering therein.

3,888,420
POSITIVE-DISPLACEMENT MIST LUBRICATOR

Wallace G. Boelkins, Grand Rapids, Mich., assignor to Uni-Mist, Inc., Grand Rapids, Mich.

Filed Nov. 16, 1973, Ser. No. 416,393
Int. Cl. B05b *1/30, 7/00*
U.S. Cl. 239—412 **17 Claims**

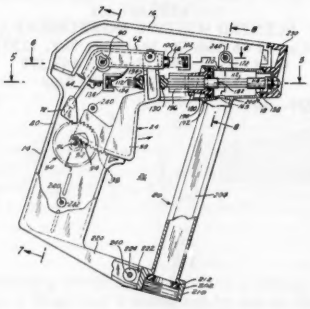


1. A positive-displacement fluid metering and mixing device, comprising in combination: means for repeatably dispensing a metered quantity of a first fluid in response to repeated pulse actuation by means of a reciprocating fluid displacement member movable through a metering passage means cooperative therewith, to positively volumetrically displace a metered quantity of said first fluid upon reciprocation of such member; means providing an inlet to supply fluid to and an outlet to convey a solid column of positively-displaced metered fluid from said fluid-dispensing means; conduit means forming a filled passage of positively-displaced metered fluid from said dispensing means, leading from said outlet to a dispensing point where metered quantities of said fluid are ejected volumetrically by operation of said displacement member; a supply of a second fluid under pressure, including a nozzle outlet at said dispensing point; and means at said dispensing point for mixing said first and second fluids at such point.

3,888,421
GUN TYPE FLUID CONTROL DEVICE

Ho Chow, River Edge, N.J., assignor to Beatrice Foods Co., Chicago, Ill.

Filed Apr. 22, 1974, Ser. No. 462,806
Int. Cl. B05b *1/32*
U.S. Cl. 239—456 **38 Claims**



1. A gun type fluid control device comprising
A. a gun body;
B. nozzle means secured to said gun body and comprising a valve chamber and a valve slidably disposed at least in part in said valve chamber, said valve being spring biased to a valve closing position and movable from said valve closing position through a plurality of partially valve opening positions to a fully valve open position;
C. fluid feed means for transporting fluid from a fluid supply to said valve chamber; and
D. means for controlling the flow of fluid from said nozzle means including
i. trigger means having a manually actuatable portion for moving said trigger means between an unactivated position through a plurality of partially activated positions to a fully activated position;
ii. connecting means operatively connecting said trigger means and said valve for movement therewith;
iii. latch means within said gun body spring biased to an unlatching position and manually movable to a latching position operatively engaging and latching said trigger means in any one of said activated positions against movement towards said unactivated position;
iv. manually actuatable control means secured to said latch means within said gun body for movement of said latch means; and
v. release means operatively connecting said trigger means and said latch means when said latch means is in said latching position and effective, when said trigger means is moved in the direction from said unactivated position corresponding to the valve closing position

toward said fully activated position corresponding to a fully valve open position, to release said latch means and enable return of said latch means to said unlatching position, thereby releasing said trigger means and enabling return of said valve to said valve closing position and said trigger means to said unactivated position.

3,888,422

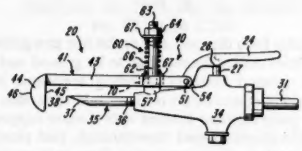
AIR GUN

Douglas N. Robinson, Canton, N.C., assignor to Dayco Corporation, Dayton, Ohio

Filed Feb. 8, 1974, Ser. No. 440,922

Int. Cl. B05b *1/26*

U.S. Cl. 239—512 **1 Claim**



1. An air gun comprising a housing having an integral stop thereon; a discharge nozzle extending from said housing and having a wedge-like end portion terminating in a comparatively sharp terminal end; a safety device for said discharge nozzle comprising a roughly L-shaped member with a first leg having an elongated slot therein and arranged roughly parallel to said nozzle, and a second leg having an arcuate outer surface secured to one end of and extending transversely of said first leg, the other end of said first leg being bifurcated; said safety device serving as a shield for said discharge device and as a deflector for air which is inadvertently discharged from said nozzle, the central portion of said first leg being normally in aligned relation with said nozzle when serving as a deflector; means supporting said safety device on said housing allowing movement thereof away from said nozzle during operation of said air gun, said means comprising a supporting lug on said housing and a pivot pin extending through said lug and the bifurcated end of said first leg; a rod assembly fixed to said housing roughly perpendicular to said nozzle; and a compression spring acting between said rod assembly and said L-shaped member to urge said first leg against said stop, said rod assembly including a rod passing through the elongated slot of said first leg to allow movement of said L-shaped member relative to said nozzle.

3,888,423

SPRAY NOZZLE FOR FLUIDIZED BED APPARATUS

Neophytos Ganiaris, Riverdale, N.Y., assignor to Struthers Scientific, New York, N.Y.

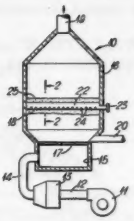
Continuation of Ser. No. 152,888, June 14, 1971, abandoned. This application Nov. 6, 1972, Ser. No. 303,806

Claims priority, application United Kingdom, June 13, 1970, 28722/70

Int. Cl. B05b *1/18*

U.S. Cl. 239—567 **1 Claim**

1. A liquid spray nozzle in combination with a fluidized bed apparatus comprising, in combination, a round pipe containing liquid spray apertures directed downward in its lower portion, and a sheet metal cover welded on the upper portion of said pipe, said cover having steeply sloping sides and a



sharply peaked top extending along said pipe within a fluidized bed.

3,888,424

MANURE SPREADER

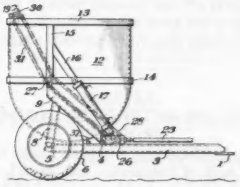
Arthur John Chapman, South Chailey, England, assignor to Sperry Rand Corporation, New Holland, Pa.

Filed Nov. 19, 1973, Ser. No. 417,454

Claims priority, application United Kingdom, Nov. 29, 1972, 55165/72

Int. Cl. A01c *3/06, 15/00*

U.S. Cl. 239—657 **16 Claims**



1. A wheeled vehicle for distributing material comprising:

a. an open-topped container for accommodating the material,

b. means for pivotably mounting said container about a pivot axis located intermediate the top and bottom thereof,

c. said pivot axis being substantially horizontal and passing through a normally vertical axis of the container which in turn passes in the vicinity of the center of gravity of the container,

d. power means operable to control tipping of the container about the pivot axis, and

e. support means for engaging the container in a rest or upright position thereof so that the weight of the container is taken by the support means, thereby relieving stress on the pivots which normally take the weight of the container in various other positions of the latter.

3,888,425

METHOD AND APPARATUS FOR TREATMENT OF FOLIATED METALLIC BEARING MATERIALS

William O. Collins, 2255 Foothill, Reno, Nev. 89502

Filed May 14, 1973, Ser. No. 359,932

Int. Cl. B02c *19/06*

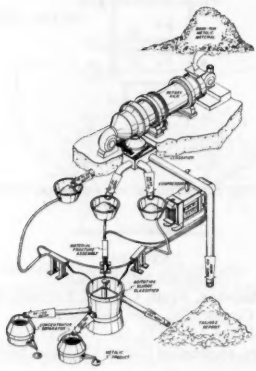
U.S. Cl. 241—5 **7 Claims**

1. The method of treating foliated metallic bearing materials comprising the steps of

heating and drying foliated metallic bearing materials,

classifying said materials into selected size groups by permitting certain of the materials to pass through screens

having several preselected mesh sizes of 10 mesh to 150 mesh,



selecting one of said sized groups and blasting said group at substantially high velocity into a chamber to fracture the foliant matrix of said foliated metallic bearing material, by impinging the sides of said chamber,

separating metallic material from said foliant matrix.

3,888,426

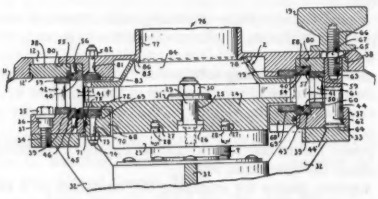
MACHINE AND METHOD FOR COMMINUTING PRODUCTS

Joe R. Urschel, 202 Michigan Ave., and Edgar R. Sanders, 708 Evans Ave., both of Valparaiso, Ind. 46383

Filed Aug. 6, 1973, Ser. No. 385,964

Int. Cl. B02c *13/18*

U.S. Cl. 241—5 **17 Claims**



1. In combination: a cutter assembly having a plurality of circumferentially spaced knives having inner cutting edges and impeller means comprising a pair of substantially round planar members, a plurality of circumferentially spaced blades interposed between and carried by said members, said blades having inner leading surfaces disposed within the confines of said impeller means and with outer leading surfaces extending outwardly and forwardly at an angle with reference to said inner surfaces for directing a product introduced into the impeller means against said cutting edges, and said knives also having outwardly extending surfaces and inner faces which are disposed to provide clearance whereby the product is caused to first substantially engage said cutting edges for cutting the product into fine particles and so that the latter will flow outwardly between said knives via said extending surfaces and substantially avoid engaging said inner faces.

3,888,427

DISPOSAL UNIT

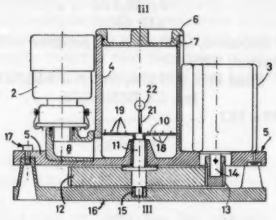
René Derouineau, Moulin de Pelissey 33, Gradignan, France

Filed Sept. 19, 1973, Ser. No. 398,695

Claims priority, application France, Sept. 26, 1972, 72.35059

Int. Cl. B02c *7/04*

U.S. Cl. 241—46.11 **5 Claims**



1. A grinder for a disposal unit or the like comprising a body having an inlet orifice for material to be ground and an outlet orifice for ground material, grinding apparatus interposed between said inlet and outlet orifices, said apparatus including a grinding plate member formed with a waste support surface having perforations formed therethrough, said plate member including tooth portions extending from said waste support surface, a coacting member disposed adjacent the waste support surface of said plate member, said coacting member including at least one notch portion, drive means for relatively moving said members in a predetermined path progressively to shift said tooth portions of said plate member through said at least one notch of said coacting member, and movable mounting means interposed between said members for enabling relative separating movements of said coacting member and said waste support surface responsive to passage between said members of a large solid waste object.

3,888,428

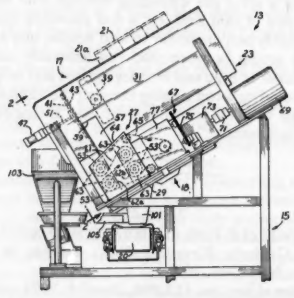
APPARATUS FOR SHREDDING

Harry A. Tabern[illegible]ki, Wonder Lake, Ill., assignor to Kraftco Corporation, Glenview, Ill.

Filed June 8, 1973, Ser. No. 368,031

Int. Cl. B02c *18/06*

U.S. Cl. 241—92 **8 Claims**



1. Apparatus for shredding material in the form of rectangular blocks into discrete particles, comprising means for holding a plurality of said blocks in tandem with each other and with the long dimension of the blocks generally inclined from the vertical, a rotatable disc disposed in a plane generally inclined from the horizontal, said disc having shredder teeth on one surface thereof, the opposing surface being plain, an

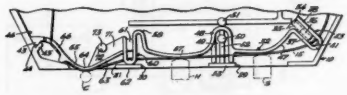
opening through the disc adjacent the teeth, said disc being disposed adjacent said holding means with the toothed face directed toward said holding means, means intermediate said holding means and said disc for continuously feeding an uninterrupted succession of single blocks of said material onto the toothed surface of said disc when said disc is rotating, means intermediate said holding means and said feeding means for automatically separating one block of said material at a time from those in tandem adjacent it on said holding means so that said separated block is free to be engaged by said feeding means, and fixed cutter means adjacent the plain surface of said disc disposed generally opposite said holding means.

3,888,429

ENDLESS LOOP MAGNETIC TAPE CARTRIDGE WITH REMOVABLE TAPE GUIDE INSERT

Bernard Mack, 1750 N.E. 191 St., North Miami Beach, Fla. 33162

Filed July 20, 1973, Ser. No. 381,010
Int. Cl. B65h 17/48
U.S. Cl. 242—55.19 A **4 Claims**



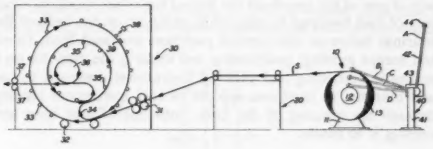
1. A tape guide insert for endless loop magnetic tape cartridges of the type comprising a cartridge case having a pair of relatively separable half shell portions defining an interior tape reel chamber and an elongated end face having a plurality of aligned, longitudinally-spaced through openings for the insertion, from the outside, of respective sensing switch, transducer and drive capstan members of associated recording and/or playback equipment, and further comprising a spindle for the removable assembly of a tape spool containing an endless winding of magnetic tape having an open loop adapted to be continuously guided across the inside of the cartridge end face for cooperative engagement with the sensing switch, transducer and drive capstan members upon application of the magnetic tape cartridge to the associated equipment for recording or playback, the improvement comprising an elongated tape guide member, said tape guide member having support means for guidingly constraining the open loop of the magnetic tape to flat-wise movement along one side of said guide member, and means for removably securing said tape guide member within one of said pair of half shell portions of the cartridge prior to the assembly of the other half shell portion thereto so that the open loop of the magnetic tape, when guidingly constrained by said tape guide member, is disposed for translatory guidance along the inside of the cartridge end face for continuous cooperative engagement by the sensing switch, transducer and drive capstan members of the associated equipment when the cartridge is applied thereto for playback or recording of the magnetic tape, said means for guidingly constraining the open loop of the magnetic tape comprising transversely-extending openings at each end of said tape guide member of sufficient width to permit the magnetic tape to pass flat-wise therethrough and along said one side of said guide member, while at the same time constraining it against relative lateral movement with respect thereto.

3,888,430

CONTROL SYSTEM FOR A STRIP ACCUMULATOR

Anthony C. Costello, Strongsville, and Leon L. Shaffer, Kent, both of Ohio, assignors to Loopco Industries, Inc., Twinsburg, Ohio

Filed Dec. 28, 1973, Ser. No. 429,052
Int. Cl. B65h 17/48
U.S. Cl. 242—55 **12 Claims**



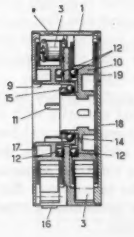
5. In combination, an uncoiler which carries a coil of strip material, an accumulator which receives said strip material from said uncoiler and at least temporarily stores the same while transferring said strip material to a processing line, means to feed the strip material from said uncoiler to the accumulator, and a control device, said control device comprising sensing means for monitoring the amount of strip material on said coil, first control means activated by said sensing means to interrupt the feed of said strip material from said uncoiler to said accumulator when a predetermined amount of said strip material remains on said coil, second control means actuated when said accumulator is substantially empty to reinitiate the feed of said strip material from said uncoiler to said accumulator, and third control means activated by said sensing means again stopping the feed of said strip material from said uncoiler to said accumulator when the strip material on said coil is substantially depleted.

3,888,431

REMOVABLE INTERCHANGEABLE HOLDER DEVICE FOR A RECORDER TAPE

Michel Laine, 20 Rue Odilon Roson 91, Bievres, France

Filed July 7, 1972, Ser. No. 269,616
Claims priority, application France, July 7, 1971, 71.24791; June 14, 1972, 72.21525
Int. Cl. G11b 23/10
U.S. Cl. 242—194 **6 Claims**



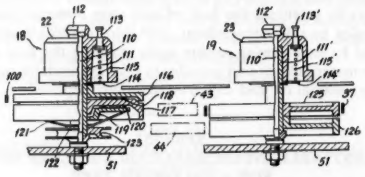
1. A tape cassette for magnetic recording tape comprising: a front surface, a rear surface and a central partition parallel to said surfaces, forming in said cassette a front and a rear compartment; a front and a rear cover; means closing said compartments; a spool in each of said compartments, the two spools having coaxial hubs having cylindrical parts and two faces each, one face on the inside next to said central partition, and the other face on the outside next to one of said covers, the rear cover and the central partition having openings on the same axis as the spool hubs; at least one straight roller and an oblique roller in each of said compartments, the two oblique rollers having parallel axes; magnetic tape running from a first spool to the straight roller, then to the oblique

roller of a compartment, and passing through the central partition and over the second oblique roller, then over the second straight roller and winding onto the second spool; a first plane ball bearing between the central partition and the inner surface of the front spool; a second plane ball bearing between the central partition and the inner surface of the rear spool; a third ball bearing between the inner cylindrical surface of the hub of the rear spool and the outer cylindrical surface of the hub of the front spool; means for clamping the hub of one of the spools on the hub of the other spool, to avoid play of said bearings by regulating pressure on the balls of the bearings between said central partition and said front faces; and means guiding, positioning and locking the cassette on a magnetic recording and pick-up instrument designed to use said cassette, at least one spindle of said instrument passing through the opening of the cover into one of said hubs and causing it to rotate.

3,888,432
RECORDING AND/OR REPRODUCING APPARATUS HAVING A REEL DISC DEVICE

Hiroshi Katoh, Yokohama, Japan, assignor to Victor Company of Japan, Ltd., Yokohama, Kanagawa, Japan

Filed Aug. 8, 1973, Ser. No. 386,714
Claims priority, application Japan, Aug. 10, 1972, 47-79514; Aug. 18, 1972, 47-96115; Aug. 25, 1972, 47-98433
Int. Cl. G11b *15/30*
U.S. Cl. 242—201 **4 Claims**



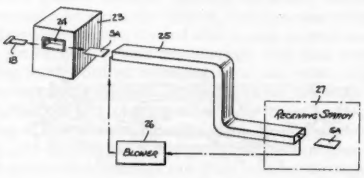
1. A recording and/or reproducing apparatus having a reel disc device comprising:
- a reel disc main structure for engaging and rotating a reel in a direction to take up a tape-form recording medium; a first reel disc part disposed below said reel disc main structure and adapted to rotate unitarily therewith;
- a shaft-form member rotatable unitarily with the reel disc main structure and said first reel disc part;
- a second reel disc part disposed below the first reel disc part and fitted onto said shaft-form member in a manner to rotate separately therefrom;
- a third reel disc part disposed below said second reel disc part and rotating unitarily with the shaft-form member;
- a fourth reel disc part disposed between second and third reel disc parts and fitted onto the shaft-form member in a manner to be rotatable separately from the shaft-form member and the second reel disc part;
- driving means for transmitting rotational power to the second reel disc part;
- coupling means operating, when in operative state, to couple the fourth and second reel disc parts for unitary rotation thereof and, when in inoperative state, to uncouple said reel disc parts;
- first rotation transmitting means interposed between the first and second reel disc parts to transmit the rotation of the second reel disc part to the first reel disc part; and
- second rotation transmitting means interposed between the fourth and third reel disc parts to transmit the rotation of the fourth reel disc part to the third reel disc part,

said second reel disc part, said first rotation transmitting means, and said first reel disc part forming a single first rotation transmission path from the driving means to the reel disc main structure, the rotation of said driving means being transmitted with a small torque from the second reel disc part by way of only said first transmission path when said coupling means is in the inoperative state, said second reel disc part, said fourth reel disc part, said second rotation transmitting means, said third reel disc means, and said shaft-form member forming a second rotation transmission path from the driving means to the reel disc main structure, in addition to said first rotation transmission path, when the coupling means is in the operative state, whereby the rotation of the driving means is transmitted from the second reel disc part simultaneously by way of the first and second transmission paths with a large torque to the reel disc main structure.

3,888,433
DISPOSABLE CARRIERS FOR PNEUMATIC CONVEYORS

Leonard A. Fish, Chicago, Ill., assignor to Bank Computer Network Corporation, Chicago, Ill.

Filed Mar. 29, 1974, Ser. No. 456,432
Int. Cl. B65g *51/06*
U.S. Cl. 243—1 **8 Claims**



1. A pneumatic conveyor system comprising:
- A. a tube extending between input and output stations;
- B. means coupled to said tube at said stations to produce a high velocity air stream flowing from the input to the output station; and
- C. a disposable carrier to transmit material between said stations, said carrier being constituted by an envelope which is sealable to enclose the material in combination with a normally flat and expansible means which when the carrier is subjected to the stream expands to enlarge the effective cross-sectional area of the carrier whereby the carrier then forms an obstacle in the stream and is propelled thereby through the tube, said expansible means being constituted by a sheet adhered to the face of the envelope along its marginal sides and downstream end to define a pocket open at the upstream end thereof, which pocket is normally flat and is distended in the tube by air entering through said upstream end.

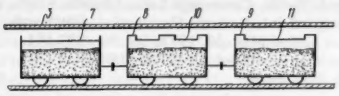
3,888,434
METHOD OF PIPELINE TRANSPORTATION OF NATURAL GAS

Nikolai Vasilievich Chersky, prospekt Lenina, 38B, kv. 14, Yakutsk; Alexandr Petrovich Klimenko, ulitsa Repina, 13, kv. 73, Kiev; July Izrail·vich Bokserman, ulitsa A. Tolstogo, 12, kv. 47, Moscow; Alexandr Isaevich Kalina, ulitsa Grimau, 5/1, korpus 1, kv. 24, Moscow, and Farit Abdrakhmanovich Karimov, ulitsa Planetnaya, 19, kv. 5, Moscow, all of U.S.S.R.

Filed Mar. 11, 1974, Ser. No. 450,156
Claims priority, application U.S.S.R., Mar. 12, 1973, 1889052
Int. Cl. B65g *51/02*
U.S. Cl. 243—38 **3 Claims**

1. A method of transporting natural gas by pipeline comprising converting the natural gas into the form of hydrates; loading said hydrates into containers; propelling said contain-

ers loaded with said hydrates through said pipeline filled with natural gas; and maintaining the pressure and the temperature



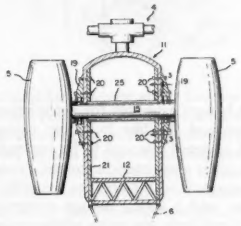
in said pipeline at such a level as to preserve the physical state of said hydrates during the process of transportation.

3,888,435

HELICOPTER WITH AUXILIARY LOAD-SUPPORTING AND LIFTING CAPACITY

Kenneth R. Foote, 14607 S.E. Madison St., Portland, Oreg. 97233

Filed July 18, 1974, Ser. No. 489,474
Int. Cl. B64d *41/00*
U.S. Cl. 244—58 **9 Claims**



1. A system for lifting and conveying loads whose weight exceeds the certified lift capacity of the powered rotor blades of a helicopter, comprising:

a helicopter having a frame and powered rotor blades providing vertical lift and means for transverse movement thereof,

load support means for securing a load,

mounting means at the center of gravity of the helicopter, one or more thruster units secured to the mounting means providing sufficient additional vertical lift capacity over the vertical lift capacity of the helicopter to lift the secured load, and

structural means extending between the mounting means, frame of the helicopter and load support means adapted to transfer the weight of the load exceeding the certified lift capacity of the helicopter to the mounting means and preventing greater than normal stress being exerted on the frame of the helicopter when lifting loads with a weight greater than the certified lift capacity of the helicopter.

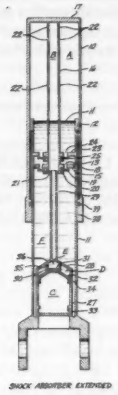
3,888,436

AIRPLANE LANDING GEAR SHOCK ABSORBER

Francis Sealey, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Apr. 1, 1974, Ser. No. 457,003
Int. Cl. B64c *25/60*
U.S. Cl. 244—104 FP **8 Claims**

1. A shock absorbing strut comprising: an outer and an inner cylinder, each having a closed end and open end, the cylinders being telescopically engaged at their open ends; a first piston assembly fitting internally in said inner cylinder, closely fitting the interior wall of said inner cylinder, and supported by means of a tube member from the closed end of said outer cylinder; and a second piston assembly attached to the inner wall of said inner cylinder and closely fitting the exterior wall of said tube member; wherein said strut is internally divided into three annular volumes; the first annular volume being bounded by the inner walls of the inner and outer cylinders, the outer wall of the tube member, the closed end of the outer cylinder and the first piston; the second annular volume being bounded by the inner wall of the inner cylinder, the outer wall of the tube member, and the first and second pistons; and the third annular volume including as boundaries the inner wall of the inner cylinder, the outer wall of the tube member, the second piston and the closed end of the inner cylinder; a plurality of orifice means such that a portion of hydraulic fluid is forced through said orifice means



SHOCK ABSORBER EXTENDED

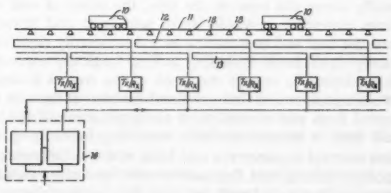
during a compressive motion of said strut, thus dissipating energy through viscous friction; means for storing a portion of said energy by compression of a first volume of gas, said gas tending to expand said strut; means for dissipating a portion of said stored energy through viscous friction during expansion of said strut; means for storing addition energy by compression of a second volume of gas having a pre-determined initial volume; and means for reducing the viscous frictional forces opposing compression and expansion of said strut which means begin to function when said second volume of gas is compressed to a volume smaller than its said predetermined initial volume.

3,888,437

VEHICLE CONTROL SYSTEMS

Michael S. Birkin, Derby, England, assignor to British Railways Board, London, England

Filed June 11, 1973, Ser. No. 368,790
Claims priority, application United Kingdom, June 14, 1972, 27869/72
Int. Cl. B61l *1/10, 27/00*
U.S. Cl. 246—63 A **8 Claims**



1. A bi-directional vehicle control system for generating information related to the location, direction, and velocity of a vehicle adapted to move along a fixed path which system operates regardless of the direction of vehicle motion along said path, said system comprising,

a plurality of uniquely identifiable transponder means positioned at known locations adjacent said path,

first means carried by said vehicle at one extreme end thereof for determining the identity of each transponder means passed by said first means,

second means carried by said vehicle at another extreme end thereof for determining the identity of each transponder means passed by said second means,

radiating cable communication means located adjacent said fixed path, and

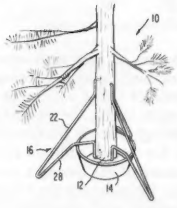
vehicle carried communication means responsive to said first and second means and coupled to said radiating cable communication means for transmitting the identity of each transponder means passed by either said first or said second means to said radiating cable communication means.

3,888,438

DISPOSABLE CHRISTMAS TREE STAND

Ned W. Mizelle, 902 Sedgewick Ln., High Point, N.C. 27260

Filed Apr. 16, 1974, Ser. No. 461,468
Int. Cl. A47g *33/12*
U.S. Cl. 248—48 **5 Claims**



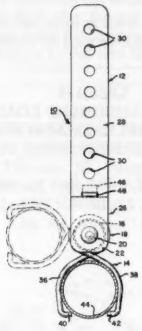
1. A Christmas tree stand comprising three substantially identical bracket members each adapted to be attached to the tree in generally equally spaced relation therearound, said members each being formed from a single elongated piece of metal rod bent intermediate its ends to form a depending loop defining a foot for engaging a supporting surface with the end portions of the rod extending from the loop at an acute angle relative to one another, one of said end portions extending upwardly and inwardly toward the tree and terminating in a short inwardly directed section adapted to pierce substantially radially into the trunk of the tree at a first point spaced substantially above the base of the tree, the other of said end portions extending upwardly from said loop and inwardly toward the tree and terminating in a downwardly depending upwardly open hook including a first vertically extending section adapted to engage the trunk of the tree at a second point intermediate said first point and the base of the tree and to extend from said second point along the trunk of the tree to said base, a second vertically extending inwardly spaced section adapted to penetrate said base, and a radially extending portion joining said first and second vertically extending portions and having a length less than the radius of the smallest tree to be supported thereon, said radially extending portion and said second vertically extending portion cooperating to support a portion of the weight of the tree and to retain said first section of said hook in firm contact with said tree trunk, said hook being spaced above the level of said foot whereby said tree base is positioned above the support surface.

3,888,439

CONDUIT HANGER ASSEMBLY FOR AUTOMOTIVE AND SIMILAR USES

Thomas J. Tuttle, Cavanaugh Lake, Chelsea, Mich., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Filed Mar. 30, 1972, Ser. No. 239,691
Int. Cl.² F16L *3/02*
U.S. Cl. 248—54 R **4 Claims**



1. A conduit hanger assembly for automotive exhaust system components and the like including elongate fastening means adapted adjacent one end to be secured to a support structure, an annular elastomeric member, connecting means securing said elastomeric member to the other end of said fastening means, and a spring hanger comprising a torsion spring having a coil body and arms which are integral extensions of the opposite ends of the coil ends which form spaced apart tong arms between which an exhaust system component can be inserted to expand and be gripped by the tong arms, the coil body of said hanger being positioned about the periphery of said elastomeric member in frictional engagement therewith, the internal diameter of said coil body in an unstressed condition being less than the outside diameter of said elastomeric member whereby, by contraction of said tong arms forming spring extensions the frictional engagement between said coil and said elastomeric member can be reduced sufficiently to permit relative angular adjustment between said elastomeric member and said hanger and whereby expansion of the coil tong arm causes contraction of said coil into tighter immobilizing frictional engagement with said elastomeric member.

3,888,440

SUPPORT ARRANGEMENT

Hugo E. Rebentisch, Garden City, Mich., assignor to Unistrut Corporation, Wayne, Mich.

Filed Apr. 8, 1974, Ser. No. 458,885
Int. Cl. A47g *29/02*
U.S. Cl. 248—73 **11 Claims**

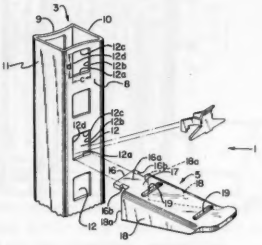
1. A support arrangement comprising:

a structural member including a side having a rectangular opening therein defined by top, bottom and side edge surfaces in the side, said side having a front surface and a rear surface and the rectangular opening in said side having a predetermined height and width;

a support member having a T-shaped end portion disposed in the rectangular opening in the side and a support portion adjoining the T-shaped end portion, said T-shaped end portion having a bottom surface abutting the bottom edge surface in the side of the structural member, front edges abutting the inner surface of the side of the structural member adjacent to the rectangular opening, a top surface, and a rear edge, said T-shaped end portion further having a maximum width less than either diagonal of

the rectangular opening but greater than the width of the rectangular opening, and having a minimum width slightly less than the width of the rectangular opening whereby the T-shaped end portion is incapable of any significant lateral movement within the opening; and

a locking clip disposed in the rectangular opening and adjacent to the top surface of the T-shaped end portion of the support member, said locking clip having a main body portion; a leg portion adjoining the main body portion and having an upper surface and a free, notched end; and side portions adjoining the main body portion, the main body portion of the locking clip being disposed adjacent



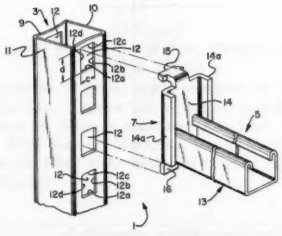
to the rectangular opening above the top surface of the T-shaped end portion of the support member and external to the outer surface of the side of the structural member, said leg portion of the locking clip extending into the opening with the free, notched end thereof engaging the rear edge of the T-shaped end portion and the top surface thereof abutting the top edge surface of the side at a predetermined region, thereby preventing any significant upward movement of the support member within the rectangular opening, and the side portions of the locking clip abutting the outer surface of the side of the structural member.

3,888,441

SUPPORT ARRANGEMENT

Hugo E. Rebentisch, Garden City, Mich., assignor to Unistrut Corporation, Wayne, Mich.

Filed Apr. 8, 1974, Ser. No. 458,886
Int. Cl. F16l *3/08*
U.S. Cl. 248—73 **6 Claims**



1. A support arrangement comprising:

a structural member including a side having a plurality of rectangular openings therein defined by top, bottom and side edge surfaces in the side, said side having a front surface and a rear surface and the rectangular openings in said side each having a predetermined height and width;

a support assembly including an end bracket and a support arm adjoining the end bracket, said end bracket including a first portion external to the outer surface of the side of the structural member, a T-shaped locking portion adjoining the first portion and extending into a first rectangular opening in the side of the structural member, and a tab portion adjoining the first portion and extending into a second rectangular opening in the side of the structural member;

said T-shaped locking portion having a bottom surface abutting the bottom edge surface associated with the first rectangular opening and front edges abutting the inner surface of the side of the structural member adjacent to the first rectangular opening, said T-shaped locking portion further having a maximum width less than either diagonal of the first rectangular opening but greater than the width of the first rectangular opening, and a minumum width slightly less than the width of the first rectangular opening whereby the T-shaped locking portion is incapable of any significant lateral movement within the first rectangular opening, said T-shaped locking portion further being capable of upward movement along the first rectangular opening when an upward motion is imparted to the support assembly; and

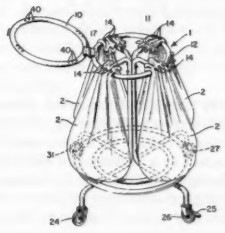
said tab portion including a first section having a surface abutting the inner surface of the side of the structural member below the bottom edge surface associated with the second rectangular opening, and a second section intermediate the first section of the tab portion and the first portion of the end bracket and extending from within the second rectangular opening to the first portion of the end bracket, said second section of the tab portion having a width slightly less than the width of the second rectangular opening whereby the tab portion is incapable of any significant lateral movement within the second rectangular opening, said first section of the tab portion also being capable of upward movement along the second rectangular opening, together with the T-shaped locking portion moving upwardly along the first rectangular opening, when an upward motion is imparted to the support assembly.

3,888,442

GARBAGE BAG SUPPORT AND STORAGE DEVICE

Harold J. Comeaux, 1448 Bonnabel Blvd., Metairie, La. 70005

Filed Sept. 7, 1973, Ser. No. 395,061
Int. Cl. B62b *3/04*
U.S. Cl. 248—98 **11 Claims**



1. A portable garbage bag support and storage device comprised of:

a multiplicity of at least generally similar elongated members fastened together in vertical array;

a caster fixedly mounted on the lower end of each of said elongated members;

a first, horizontally disposed, upper member fastened to the upper ends of said elongated members opposite from said casters;

a second, upper member substantially identical and hingedly mounted to said first, upper member;

at least one lower, horizontally disposed support member means fixedly attached to the lower section of said elongated members for supporting the bottom of the bags

supported by the garbage bag device; each said elongated members being generally "C"-shaped, having a central portion and upper and lower portions or legs, with the central portions of the elongated members being secured together and the upper and lower portions radiating outwardly; said first and second upper members being supported on the upper portions or legs of said "C"-shaped members, and said lower member means being supported on the lower portions or legs of said "C"-shaped members; said first and second upper members and said lower member means being tubular and forming circular rings, with the rings having centers which lie along a line substantially coinciding with the central portions of the "C"-shaped members; said lower member means including two concentric, spaced rings, the inner one of which lies directly under and in line with said first upper member and is substantially identical thereto; and

grasping means mounted between said upper members for grasping the upper portions of bags supported by the garbage bag device.

3,888,443

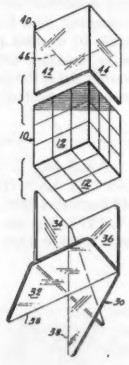
SUPPORT STAND FOR PUZZLE BLOCKS OR OTHER ITEMS

Cameron D. Flanigen, P.O. Box 82565, Hapeville, Ga. 30354

Division of Ser. No. 225,788, Feb. 14, 1972, Pat. No. 3,771,795. This application Nov. 2, 1973, Ser. No. 412,338

Int. Cl. A47g *23/00;* **F16m** *11/22*

U.S. Cl. 248—152 **3 Claims**



1. In a support stand: a three-sided, tilted support stand having three flat surfaces comprising one-half of an open parallelepiped supported in elevation, each surface being inclined with respect to a vertical axis thereby being capable of supporting loose items such as individual puzzle blocks arranged in a cube on the three surfaces, said stand being constructed from and comprising three flat attached sheets each having a tapered end and together providing three support legs which intersect, said sheets being supported along a respective edge of each sheet which edge extends along and across one of the other sheets.

3,888,444

ADJUSTABLE SUPPORT COLUMN

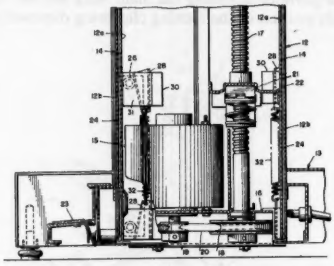
Leonard J. Yindra, Manitowoc, and Robert A. Karl, Kewaunee, both of Wis., assignors to American Hospital Supply Corporation, Evanston, Ill.

Filed July 26, 1971, Ser. No. 165,962

Int. Cl. F16m *13/00*

U.S. Cl. 248—188.5 **12 Claims**

1. An adjustable support column for tables and the like comprising a hollow outer tube of generally uniform cross section having substantially planar side walls meeting along a plurality of vertically-extending corners, a hollow inner tube of similar generally uniform cross section telescopingly received in said outer tube, one of said tubes being adapted for connection at its upper end to a table top or the like and the other of said tubes being adapted for connection at its lower end to a floor-engaging base, the external cross sectional dimensions of said inner tube being sufficiently smaller than the internal cross sectional dimensions of said outer tube to



define a perimetric space therebetween, and a plurality of vertically-elongated bearing strips mounted upon said inner tube within said space and having vertical edge surfaces bearing against each of the inside surfaces of the walls of said outer tube adjacent the corners thereof, each of said strips extending along a plane parallel with one of said walls of said outer tube and having said vertical edge surface thereof bearing against a wall of said outer tube adjacent to said one wall.

3,888,445

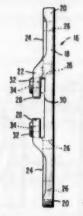
BRACKET

Ralph T. Pence, Lewis, Ind., assignor to Jack M. Hallet, Terre Haute, Ind.

Filed Sept. 20, 1973, Ser. No. 399,246

Int. Cl. E06b *7/28;* **E05f** *3/00*

U.S. Cl. 248—225 **3 Claims**



1. A bracket base member comprising:

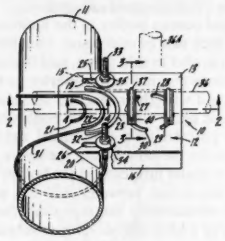
first and second end portions, each having a plurality of mounting holes therethrough to permit mounting of said bracket base member on a surface;

a center portion joining said first and second end portions and having raised areas defining a mounting channel for receiving an attachment flange, with two threaded openings, one through each raised area, to receive threaded fastening means for clamping an attachment flange within the mounting channel, said threaded openings being non-centrally positioned with respect to said bracket base member and on opposite sides of the center thereof.

3,888,446
POLE MOUNTING BRACKET ATTACHMENT

Dennis H. O'Brien, Omaha, and Dennis D. Havranek, Fremont, both of Nebr., assignors to Valmont Industries Inc., Valley, Nebr.

Filed Apr. 2, 1974, Ser. No. 457,202
Int. Cl. F16b 7/00; B65d 63/08
U.S. Cl. 248—231 7 Claims



1. A bracket attachment for mounting a luminaire, traffic signal, or other device on a pole, adapted for use with poles in a range of varying diameters, comprising:

a flat mounting plate having two pole-engaging wedge elements formed integrally with the plate and bent from the plane of the plate to project outwardly of the obverse surface of the plate;

at least one retainer flange affixed to the mounting plate and projecting outwardly of the reverse surface of the mounting plate;

a flexible retainer member looped around the retainer flange, the two free ends of the retainer member extendable around a pole from the reverse surface of the mounting plate to the obverse surface of the plate;

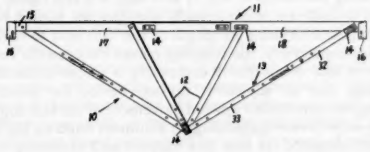
adjustable fastening means for securing the free ends of the retainer member to the mounting plate to affix the mounting plate to a pole, tightening of the adjustable fastening means serving to draw the wedge elements into engagement with the pole, with one end of the mounting plate projecting outwardly from the pole in approximately tangential relation thereto;

and adjustable device mounting means for mounting a device on the projecting end of the mounting plate, at any mounting angle within a substantial angular range, and within a substantial displacement range relative to the mounting plate.

3,888,447
SCAFFOLDING FOR SUPPORTING FRESH CONCRETE FLOOR SLABS

Yakichi Tsushima, Nagoya, Japan, assignor to Nisshin Tsushima Co., Ltd., Nagoya, Aichi and Iwatani & Co., Ltd., Osaka, both of, Japan, a part interest to each

Filed Feb. 15, 1974, Ser. No. 443,090
Int. Cl. E04g 3/00; E04b 1/18; E04g 11/50
U.S. Cl. 248—235 5 Claims

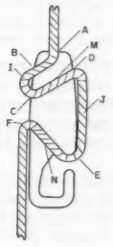


1. A scaffolding for temporary support of a fresh concrete floor slab, comprising means defining a main chord member disposed substantially horizontally and a pair of lower chord members detachably joined together at adjacent ends, the free ends of said lower chord members being respectively detachably joined to said main chord member to define a triangular structure, and at least one bracing member detachably fastened at the joint between lower chord members, the free end of said bracing being detachably joined to said main chord member, said main chord member and the lower chord members each respectively consisting of two separate members which are overlappingly joined together so as to form a single chord, the two members of each lower chord being overlappingly joined together with an intermediate element interposed therebetween, said intermediate element including opposedly wound threads at opposite ends, each member being connected to said intermediate element through a screw means such that when said intermediate element is rotated said chord members are relatively moved to change the lengths of said lower chord members.

3,888,448
ADJUSTABLE HANGER

Charles A. Rowland, 595-D Hedgebrook Ave., Columbus, Ohio 43214

Filed Aug. 23, 1973, Ser. No. 390,954
Int. Cl. F16g 11/00
U.S. Cl. 248—328 2 Claims



1. A unitary load suspension device for adjustable positioning along a vertically arranged length of cord or the like comprising:

a body member including an integral load supporting hook at one end thereof and means defining a plurality of passageways therethrough which when the cord is inserted therein confine the cord to a tortuous path to frictionally hole said body at a preselected position along the cord including:

a first passageway opening from the end of said body opposite from said hook, extending at an acute angle to the longitudinal axis of said body member and exiting through a side face thereof;

a second passageway, spaced from and parallel to said first, opening from said side face and exiting through the opposite side face; and

a third passageway spaced from said second, lying at an acute angle thereto, opening from a point on said hook end of said body and exiting to said side face, all of said passageways lying substantially in a common plane.

3,888,449
ANTI-VIBRATION MOUNTINGS

Jan Jablonski, North Halling, and Colwyn Francis Stone, Chatham, both of England, assignors to Elliot Brothers (London) Limited, Chelsmford, England

Filed Jan. 14, 1974, Ser. No. 433,250
Claims priority, application United Kingdom, Jan. 16, 1973, 2314/73
Int. Cl. F16m 13/00
U.S. Cl. 248—358 R 3 Claims

1. An anti-vibration mounting, for isolating equipment from

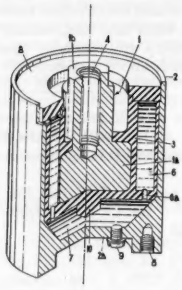
vibration of a structure on which the equipment is mounted, comprising:

A. a first member adapted to be secured to one of the equipment and the structure;

B. a second member coaxially surrounding the first member and adapted to be secured to the other of the equipment and the structure;

C. a member of resilient material secured to the first member and to the second member;

D. a number of cylindrical fluid-filled chambers arranged in annular configuration between the sides of the first and



second members and each having a wall area formed at least partially by said resilient material member; and

E. a further fluid-filled chamber positioned between the ends of said first and second members and having a wall area formed at least partially by said resilient material member;

F. each said cylindrical chamber communicating via a respective bore with said further chamber so that fluid transfer between the chambers due to distortion of said resilient material member provides damping of relative movement between the first and second members.

3,888,450

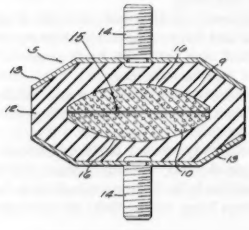
VIBRATION ABSORBING MOUNTING ELEMENT

Richard W. Seilenbinder, Milwaukee, Wis., assignor to Briggs & Stratton Corporation, Wauwatosa, Wis.

Filed May 31, 1974, Ser. No. 475,045

Int. Cl. F16f *15/04*

U.S. Cl. 248—358 R **5 Claims**



5. A mounting element by which a vibration generating element can be carried by a supporting member in generally fixed relation to said supporting member, but by which the vibration generating device is permitted to have small movements relative to the supporting member, in response to the vibration forces generated by te device, and in which a substantial portion of the energy of such movements is absorbed so that the mounting element isolates the vibration of the device from the supporting member, said mounting element comprising:

A. a pair of attachment members, one securable to a vibration generating device and the other securable to a supporting member which carries said device;

B. a hollow elastomer pad having substantially thick wall portions and to opposite sides of which said attachment members are secured in substantially symmetrical relation to a plane through the hollow interior of the pad, said pad thus providing a resilient connection between the attachment members that provides for said small movements of the vibration generating device;

C. a pair of rigid porous bodies in the hollow interior of the pad, one at each side of said plane, each having a smooth, flat surface parallel to said plane, said bodies having other surface portions bonded to the interior surface of the pad to be thus held with their said flat surfaces in opposing, slightly spaced apart relation, the bodies being thus constrained to partake to a substantial extent of relative motion between the attachment members; and

D. a quantity of liquid lubricant in the hollow interior of the pad, filling the space between said flat surfaces of the bodies and substantially impregnating their pores, said liquid being of a kind that developes substantial shearing friction in consequence of relative movement between the bodies and thus serving to absorb a substantial amount of the energy that is expended in effecting relative motion between the bodies.

3,888,451

VEHICLE SEATS

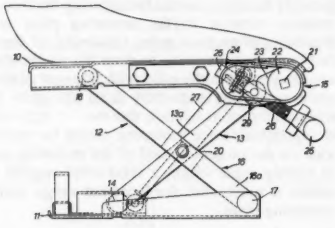
Robert R. Lacey, Bromham, England, assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Dec. 4, 1973, Ser. No. 421,712

Claims priority, application United Kingdom, Dec. 6, 1972, 56193/72

Int. Cl. B60n *1/02*

U.S. Cl. 248—399 **7 Claims**



1. A vehicle seat comprising a seat support and a base support interconnected and guided for upward and downward relative movement by a spring suspension, the spring suspension comprising a coupling arm having a first pivotal connection between an end part of the arm and the base support and a second pivotal connection between the opposite end part of the arm and the seat support, one of said pivotal connections comprising a torsion bar extending axially within a tube, the tube being journalled in one of said supports and rigidly connected to said arm, means rigidly coupling the torsion bar at spaced positions along its length to the tube and to said one support respectively, the coupling means between the torsion bars and said one support comprising a torque-transmitting coupling, and an adjustable up-stop device for selectively limiting the permissible upward movement of the seat support, the up-stop device comprising an abutment fixed on the tube, a guide mounted on said one support and extending transversely of the seat and an abutment slidably mounted in the guide, one of said abutments having steps thereon extending longitudinally of the guide, each step of one abutment being arranged for engagement with the other abutment at a different angular position of the tube relative to said one support

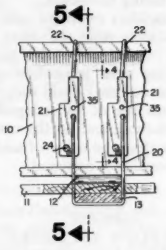
thereby to halt the upward movement of the seat support at a different height relative to the base support.

3,888,452

HANGER ASSEMBLY FOR ATTACHING A FORM TO A STRUCTURAL BEAM

Edward J. Anderson, 21 Brown St., West Babylon, N.Y. 11704

Filed June 26, 1973, Ser. No. 373,625
Int. Cl. E04g *13/04*
U.S. Cl. 249—23 **11 Claims**



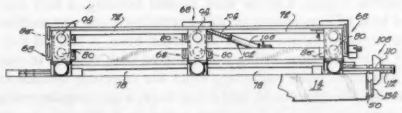
1. A hanger assembly for holding a pouring form for encasing a structural member, said assembly comprising first and second pairs of U-shaped members, and separate toggle clip means for interconnecting each end of each U-shaped member of said first pair of U-shaped members to a separate end of the U-sahped members of said second pair of U-shaped members, the two ends of each U-shaped member of said first pair of U-shaped members being interconnected by separate said toggle clip means to the ends of separate U-shaped members of said second pair of U-shaped members.

3,888,453

TOP BLOCK STOP FOR APPLYING A LONGITUDINAL FORCE TO THE TOP BLOCK OF A PRESSURE CASTING MOLD

Lyman Wood Jeffreys, Mt. Prospect, Ill., assignor to AMSTED Industries Incorporated, Chicago, Ill.

Filed Apr. 12, 1974, Ser. No. 462,612
Int. Cl. B22d *17/06*
U.S. Cl. 249—82 **6 Claims**



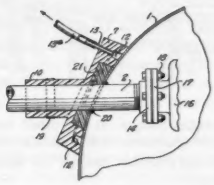
1. In a mold apparatus having side blocks laterally movable toward and away from each other and a plurality of movable inner blocks, including a longitudinally extending top block having first and second ends, said top block being positioned between the side blocks and engaged therewith, the side blocks and the inner blocks defining together a casting cavity and also a riser cavity at the first end of said top block, a top block support beam connected to said first end of said top block, a top block stop connected to said top block support beam at said second end of said top block, said top block stop having means reacting against a portion of said mold apparatus for applying an engaging force to said first end of said top block in a longitudinal direction away from said riser cavity.

3,888,454

MEANS FOR FORMING A SEAL ABOUT A CONDUIT

Frank G. Treadaway, Mineral Wells, Tex., assignor to Harsco Corporation, Harrisburg, Pa.

Filed Jan. 3, 1973, Ser. No. 320,760
Int. Cl. B22d *19/04;* **B29c** *27/00;* **C09j** *5/10*
U.S. Cl. 249—90 **3 Claims**



1. A mold to form a seal about a conduit extending through a wall comprising; a hollow flexible cylindrical mold body having a central passage extending therethrough; upper and lower end surfaces on said hollow cylindrical mold body, said lower end surface having an annular groove formed therein adjacent the periphery thereof, said annular groove extending about said central passage; and means to evacuate air from said annular groove to secure said lower end surface on said cylindrical body to the wall about the conduit when the conduit is positioned to extend through said passage.

3,888,455

TIE BAR FOR SUPPORTING FORM WALLS OF A CONCRETE FORM

Glenn H. Mikus, 3820 Woodcrest Dr., St. Louis County, Mo. 63124

Division of Ser. No. 128,951, March 29, 1971, Pat. No. 3,767,158. This application Aug. 23, 1973, Ser. No. 391,152
Int. Cl. E04g *9/00*
U.S. Cl. 249—214 **3 Claims**

1. A tie bar for holding inner and outer form walls of a concrete form in spaced relation, comprising an elongate metal bar of generally circular cross-section throughout its length, a generally centrally located flattened ear extending laterally of said bar for holding said bar against rotation in said concrete wall, the ends of said bar having flat portions formed thereon for gripping with a wrench to twist said bar, a first pair of closely spaced shoulders formed near each end of said bar inwardly from said flat end portions, the innermost of said first pair of shoulders being coplanar with the faces of the concrete wall to be poured, a second pair of closely spaced shoulders formed at each end of said bar between said first pair of shoulders and said flat end portions, and score lines around said bar inwardly of the innermost of said first pair of shoulders.

3,888,456

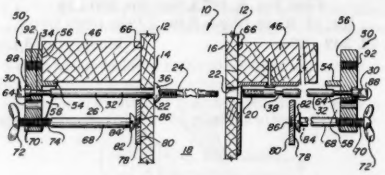
COMBINATION TIE END LATCH AND REINFORCING TIMBER CLAMP

William E. Umstead, 1010 Ogden St., Denver, Colo. 80218

Filed Aug. 16, 1973, Ser. No. 388,972
Int. Cl. E04g *17/00*
U.S. Cl. 249—219 W **18 Claims**

1. The combination tie end latch and reinforcing timber clamp which comprises: bracket means; latch means carried by said bracket means for detachably connecting same for tiltable movement about an axis intermediate its margins to a concrete form tie or the like in spaced relation to a fixed

abutment; and, extendable means carried by said bracket means on one side of said axis of tiltable movement operative upon actuation to engage the fixed abutment and tilt the



portion of said bracket means on the other side of said axis inwardly toward said abutment with a jaw-like action effective to clamp a reinforcing member against the latter when interposed therebetween.

3,888,457

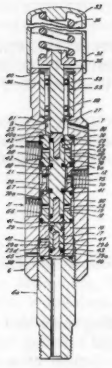
HIGH OR LOW PRESSURE CONTROL DEVICE

Joseph W. Taylor, 10010 Briarwild, Houston, Tex. 77055

Continuation of Ser. No. 312,856, Dec. 7, 1972, abandoned. This application Jan. 2, 1974, Ser. No. 430,162

Int. Cl. F16k *31/143*

U.S. Cl. 251—14 **9 Claims**



1. A device for controlling the flow of fluid in response to pressure variations in a controlled member, said device comprising:

a valve body having an axial bore therethrough;

said valve body having first and second inlet ports and an outlet port all communicating between said bore and exterior of said body;

cylindrical hollow adapter means positioned in said bore, said adapter means having lateral passages therethrough communicating between both of said inlet ports and the interior of said adapter means;

slide valve means positioned within the interior of said adapter means;

said slide valve means including a first pair of annular seal members positioned on opposite sides of said outlet port; conduit means for communicating between said adapter means interior and said controlled member whereby pressure from said controlled member may exert a force against said slide valve means;

resilient means for yieldably urging said slide valve means in the direction of said conduit means, and means for varying the force so urging said resilient means;

combination means for selectively (a) opening fluid communication between said first inlet port and said outlet port while simultaneously blocking fluid communication between said second inlet port and said outlet port deemed a first position, (b) opening fluid communication between said second inlet port and said outlet port while simultaneously blocking fluid communication between said first inlet port and said outlet port, deemed a second position, and (c) blocking communication between both of said inlet ports and said outlet port, deemed a third position; and

said combination means including the following;

a radially enlarged annular portion of said slide valve means having oppositely facing shoulders,

oppositely facing shoulders provided said adapter means abuttable with said slide valve shoulders, and

the axial separation of said slide valve shoulders is sufficiently less than the axial separation of said adapter shoulders such that on one of said slide valve shoulders abutting an adjacent one of said adapter shoulders said first position is assumed, and on the other of said slide valve shoulders abutting the other of said adapter shoulders said second position is assumed.

3,888,458

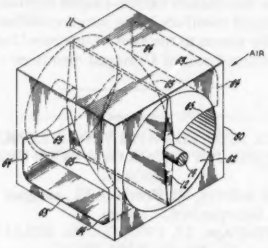
MASS FLOW AIR METER

William C. Bubniak, Troy; Louis W. Huellmantel, Warren, and Harry R. Mitchell, Bloomfield Hills, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 278,958, Aug. 9, 1972, Pat. No. 3,817,099. This application Nov. 19, 1973, Ser. No. 417,242

Int. Cl. F16k *47/00, 1/22*

U.S. Cl. 251—118 **4 Claims**



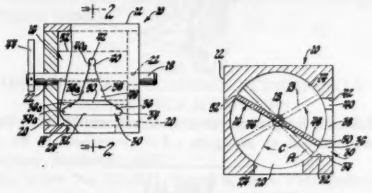
1. An air valve for use in an engine air induction system having throttle means for controlling air flow therethrough, said air valve including a housing in the system upstream of the throttle means, a cross bore in said housing, a first contoured hole of continuous profile extending from one surface of said housing to run out at said cross bore, a second contoured hole, identical in size but inverted with respect to said first contoured hole, extending from the opposite surface of said housing to run out at said cross bore, a rectangular valve plate rotatably mounted in said cross bore for movement between closed and open positions relative to said contoured holes, said valve plate when in an open position relative to said contoured holes defining flow areas, the total flow area uncovered for any given valve plate open position being comprised of two diametrically opposite orifices, the orifice areas uncovered by said valve plate being in planes parallel to the continuous cross sections of said contoured holes, said first contoured hole and said second contoured hole each being of a shape to provide a straight-through flow path through said housing with large flow areas immediately upstream and downstream, relative to fluid flow through said housing, from said orifices, and with predetermined scheduled flow areas, which as uncovered by said valve plate, define said orifices, the contoured shape of each of said scheduled flow areas being such so as to con-

trol the percentage change in flow area for a fixed incremental change in said valve plate rotative angle to a constant value.

3,888,459
FLOW CONTROL VALVE

William C. Bubniak, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 23, 1973, Ser. No. 418,602
Int. Cl. F16k *47/00, 1/22*
U.S. Cl. 251—208 **4 Claims**

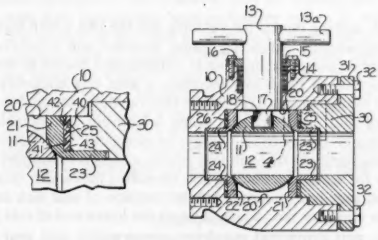


1. A flow control valve including a valve body having a circular cross bore therethrough, side covers secured to opposite sides of said valve body to enclose said cross bore, a contoured hole of continuous profile extending from one surface of said valve body to run out at said cross bore, said contoured hole in cross section being of a predetermined scheduled area configuration, a hole extending from a surface of said valve body to run out at said cross bore, a shaft journalled in said side covers and extending through said cross bore concentrically therewith, a rectangular valve plate fixed to said shaft for rotation in said cross bore about the axis of rotation of said shaft for movement between a closed position and a full open position relative to said contoured hole, the included angle in the cross bore between said contoured hole and said hole when said valve plate is in said full open position being less than 180°, said valve plate when in an open position defining with said contoured hole a flow area, the size of which increases at a predetermined fixed rate relative to the rotative angle of said valve plate as determined by the predetermined scheduled area configuration of said contoured hole.

3,888,460
BALL VALVE COMPRESSION SEAT

James W. Sigmon, Charlotte, N.C., assignor to Sigmon Corporation, N.C.

Filed Mar. 18, 1974, Ser. No. 451,784
Int. Cl. F16k *5/06*
U.S. Cl. 251—315 **5 Claims**

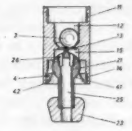


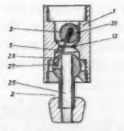
1. A fluid flow controlling valve comprising:
- a valve body having a conduit extending therethrough for guiding fluid flow from an upstream portion thereof toward a downstream portion thereof,
- a valve member defining a spherical segment surface and mounted within said body portion for rotation about an axis perpendicular to said conduit and between flow permitting and flow blocking positions for controlling flow of fluid through said conduit,
- seat ring means mounted within said body and encircling one of said upstream conduit portion and said downstream conduit portion for sealingly engaging said spherical segment surface of said valve member and cooperating with said valve member for sealing against fluid flow through said valve upon rotation of said valve member to the flow blocking position,
- said valve body and said seat ring means having axially opposing surfaces extending generally perpendicular to said conduit and having circumferentially opposing surfaces extending generally parallel to said conduit and said opposing surfaces defining the boundary of a confining volume,
- resilient thermoplastic compression seal means compressively confined within said confining volume for exerting on said seat ring means force biasing said seat ring means into engagement with said valve member, said seal means contacting the entirety of said boundary surfaces of said confining volume for sealing against leakage flow between said valve body and said seat ring means, and
- means for applying to said seal means compressive force directed axially of said conduit for maintaining said seal means in compressive confinement and thereby for maintaining sealing engagement between said valve member and said seat ring means.

3,888,461
QUICK-ACTING WATER-TAP

Dan Bron, Haifa, Israel, assignor to Unitrol Water Saving Products Ltd., Tel-Aviv, Israel

Filed Apr. 8, 1974, Ser. No. 459,035
Claims priority, application Israel, Apr. 18, 1973, 42057
Int. Cl. F16n *1/00;* **F16k** *31/50, 31/58*
U.S. Cl. 251—351 **6 Claims**





1. A quick-acting water-tap including a housing adapted to be connected to a faucet or the like, a valve seat within said housing, a receptacle disposed above said valve seat and a ball within said receptacle capable of being sealingly engaged upon said valve seat; said ball being freely movable within said receptacle, a water spout disposed within said housing below said valve seat, said water spout having a through water passage and comprising an outlet pipe having a spherical end portion, a finger projecting outwardly from said end portion, said water spout being fastened within said housing with the spherical end portion being movably and rotatably positioned below said valve seat said water spout being movable to a position whereby said finger will engage said ball to displace same from its seated condition when said water spout is coaxial with said valve seat, said water spout being angularly displaceable relative to said housing and movable to a position withdrawing said finger thereby enabling return of said ball to

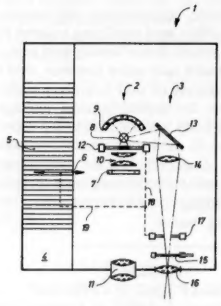
its seated condition, with the degree of angular displacement determining the flow past the valve seat when the ball is unseated.

3,888,462

PHOTOGRAPHIC PROJECTOR WITH FADER DEVICE

Reinhard Sobotta, Mascherode, Germany, assignor to Rollei-Werke Franke & Heidecke, Braunschweig, Germany

Filed Oct. 24, 1973, Ser. No. 409,302
Claims priority, application Germany, Oct. 31, 1973, 2253267
Int. Cl. G03h *21/26, 23/16*
U.S. Cl. 353—29 **9 Claims**



1. A picture slide projector comprising means for projecting a main beam of light onto a viewing screen, slide holding means for holding a selected one of several picture slides in said main beam in position so that an image of such slide may be projected along said main beam onto the viewing screen, means for hold a slide magazine containing several picture slides, slide changing means for moving successive slides from said magazine to said slide holding means in said main beam and vice versa, means for projecting a non-picture auxiliary beam of light onto the same viewing screen for screen illumination purposes only without producing any picture image thereon, and fading means for fading out one beam and fading in the other beam alternately, so that the image of the picture slide may be faded from the viewing screen in connection with a change of slides and while so faded out the screen may be illuminated to approximately the same brilliance by light from the auxiliary beam and without any picture during such illumination by the auxiliary beam, there being no slide holding means in said auxiliary beam and no slide changing means for moving a slide into and out of said auxiliary beam.

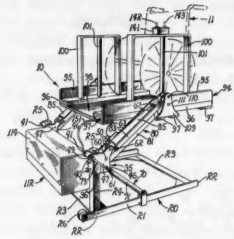
3,888,463

SELF-LEVELING HOIST FOR WHEEL CHAIRS

Robert A. O'Brien, 2303 E. Acacia, Fresno, Calif. 93726, and Manuel Peterson, 3128 Ventura, Fresno, Calif. 93702

Filed Aug. 20, 1973, Ser. No. 389,463
Int. Cl. B60p *1/48*
U.S. Cl. 254—10 C **4 Claims**

1. A wheel chair hoist comprising a mobile frame, elongated support means mounted on the frame and upwardly extended therefrom, bracket means mounted on the support means for elevational adjustment, means for securing the bracket means in adjusted position on the support means, a wheel chair platform having oppositely disposed open ends and a path of wheel chair travel between the open ends, substantially parallel arms pivotally connected to the bracket means and to the platform on opposite sides of the path mounting the platform on the frame at one side of the support means for concurrent longitudinal reciprocal movement and adjustable elevational movement in parallelism, powered means interconnecting the bracket means and the arms to raise and to lower the platform on the frame, and a counterbalance mounted on the bracket means on the opposite side of the support means from the



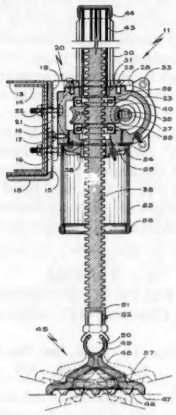
platform for integral elevational adjustment with the bracket means.

3,888,464

INDEPENDENT JACKING SYSTEM FOR VEHICLES AND THE LIKE

Karl H. Felsen, 47 Matinee Bay, Winnipeg, Manitoba, Canada

Filed May 7, 1974, Ser. No. 467,661
Claims priority, application Canada, June 26, 1973, 174930
Int. Cl. B66f *3/18*
U.S. Cl. 254—86 R **8 Claims**



1. A jacking device for vehicles and the like which include a longitudinally extending frame member and a source of electrical energy; comprising in combination means to secure said device to the frame member, a gear box enclosure secured to said means, a reversible electric motor secured to one side of said enclosure and being selectively connectable to said source of electrical energy, an elongated jack screw extending vertically through said gear box, means to support said screw for vertical extending and retracting movement relative to said gear box, means to inhibit rotation of said jack screw within said gear box, a jack shoe on the lower end of said jack screw, and worm and nut drive means within said gear box operatively connected between jack screw and said electric motor, a synchronized limit switch assembly secured to the other side of said gear box for disconnecting said electric motor from said source of electrical energy at the upper and lower limits of travel of said jack screw, said worm and nut drive means including a worm gear, a worm gear shaft journalled for rotation within said gear box and a nut screw threadably engaging around said jack screw and being en-

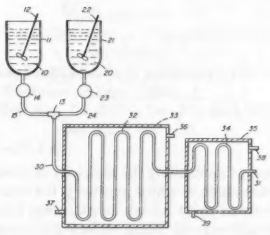
gaged by said worm gear, said nut including bearing support means within said gear box, and constituting said means for supporting said jack screw, said limit switch assembly including a casing, a limit switch screw shaft journalled for rotation within said casing, gear means connecting said worm gear shaft with said limit switch screw shaft, a non-rotatable nut engaged around said limit switch screw shaft for travel therealong when said shaft is rotated, and upper and lower limit switches in said casing operated by said last mentioned nut when said nut is at the upper and lower limits of travel upon said limit switch screw shaft, said limit switches being operatively connected between said source of electrical energy and said electric motor.

3,888,465

APPARATUS FOR COMBINING CHEMICALLY COMPATIBLE SOLUTIONS

James P. Terwilliger; Anthony D. Gingello, and John R. Tinney, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 231,841, March 6, 1972. This application Feb. 13, 1974, Ser. No. 442,272
Int. Cl. B01f *15/06*
U.S. Cl. 259—4 **1 Claim**



1. Apparatus for the continuous chemical sensitization of photographic emulsions, comprising the steps of:

means for pumping a separate flow of a photographic emulsion and of a sensitizer solution at a predetermined rate to a common junction at which the flows intermix into a common flow upon coming into contact;

means connecting the pumping means to the common junction and the latter to a discharge outlet and forming between the common junction and the outlet an extended path through which the common flow is moved by the pumping means for treatment thereof prior to discharge at the outlet;

means arranged in the extended path for treating the common flow comprising heat exchanger means in which a first section of the path is contained for maintaining the common flow at a predetermined temperature and cooling means in which a second section of the path is contained for rapidly reducing the temperature of the common flow to produce a uniformly sensitized emulsion; and means associated with the connecting means for continuously mixing the common flow during its movement through substantially the entire length of the path.

3,888,466

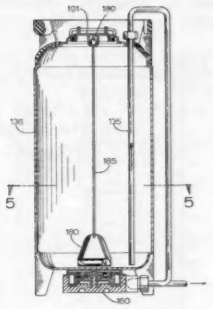
AGITATING APPARATUS

Jason K. Sedam, Dunwoody, Ga., assignor to The Coca-Cola Company, Atlanta, Ga.

Division of Ser. No. 111,959, Feb. 2, 1971, Pat. No. 3,744,764. This application May 7, 1973, Ser. No. 357,306
Int. Cl. B01f *13/08*
U.S. Cl. 259—44 **5 Claims**

1. An agitator dispenser having a container for holding a fluid to be dispensed as a consumable beverage wherein:

Agitating means are provided for agitating a dispensable fluid in the container and wherein driving means are provided for driving the agitating means, torque being applied to the driving means by the same dispensable



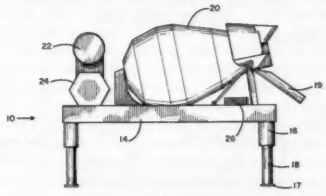
fluid after it has been withdrawn from the container, and further wherein said agitating means comprises a magnetic element immersed within the container holding the fluid so as to form a magnetic coupling with said driving means when said torque is applied to the driving means.

3,888,467

CONCRETE HOLDING AND MIXING ASSEMBLY AND METHOD OF TRANSPORTING AND DISTRIBUTING CONCRETE

Charles W. Sheets, 1321 Greenfield Dr. No. 12, El Cajon, Calif. 92021

Filed Sept. 27, 1973, Ser. No. 401,215
Int. Cl. B28c *5/18*
U.S. Cl. 259—148 **7 Claims**



1. An assembly independent from a truck chassis or trailer frame for holding and mixing concrete comprising: a mixing drum, power drive means for rotating said drum, a base support member to which said drum and drive means are secured, and hydraulic lift means for selectively raising and lowering said base support member and being extendable to support said assembly on a ground surface and retractable to lower said assembly for being mounted on a truck chassis or trailer.

3,888,468

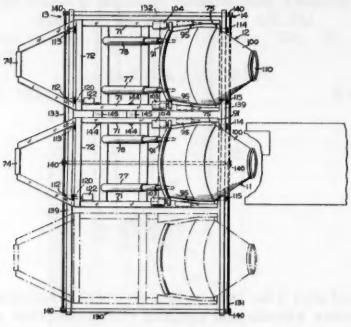
MOBILE CONCRETE BATCH PLANT AND DUAL SHIFTABLE MOBILE MIXERS THEREFOR

Max D. Albin, Urbana, Ill., assignor to Koehring Company, Milwaukee, Wis.

Filed Feb. 26, 1974, Ser. No. 446,004
Int. Cl.[2] B28C *7/14, 9/04*
U.S. Cl. 259—171 **10 Claims**

6. In combination: a batch plant for supplying material from an elevated discharge outlet thereon, guide rail means spaced from and relatively below said discharge outlet, a plurality of mobile mixers for supplying vehicles, each mixer having

ground engaging wheels enabling over-the-road transport and further having guide wheels for engagement with said guide rail means, each mixer having a drum thereon for receiving material from said discharge outlet and for mixing and discharging said material into said other vehicles after it has been mixed, means for detachably connecting said plurality of mixers together to enable simultaneous movement of said

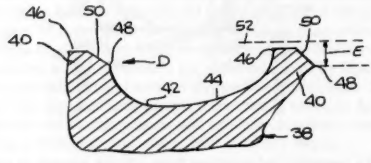


plurality of mixers on said guide rail means, and means including reversible drive means for at least one of said guide wheels on one of said mixers for moving said plurality of mixers simultaneously on said guide rail means first in one direction and then in another direction so that the drum of one mixer is in one location to receive material from said discharge outlet while the drum of another mixer is in another location to discharge mixed material into one of said vehicles.

3,888,469
EXTRUSION MILL

Paul Geyer, Detroit, Mich., assignor to Uniroyal, Inc., New York, N.Y.

Filed Feb. 5, 1974, Ser. No. 439,776
Int. Cl. B29b 1/06
U.S. Cl. 259—191 **9 Claims**

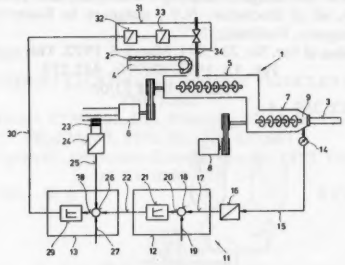


1. In a mill for mixing and extruding elastomeric stock, said mill including a barrel having an elongate bore, and a worm rotatably supported in said bore, said worm in axial cross-section presenting helical threads and grooves alternating with one another and which are adapted to mix and advance elastomeric stock in said bore, said threads terminating in respective crests which extend adjacent to an internal surface of said barrel defining said bore, each of said crests having frontal and distal portions facing downstream and upstream of said bore, respectively, an improvement comprising deaerating means for venting-to-atmosphere only unidirectionally upstream of said bore fluid collected in the latter from elastomeric stock mixed by said worm, said deaerating means defining a helical venting path between said internal surface of said barrel and said distal portion of each of said crests, said helical venting path having a maximum radial clearance which is greater than any clearance between said internal surface of said barrel and said frontal portion of each of said crests, each of said grooves having a tapered bottom which deepens in a direction downstream of said bore, the more shallow upstream region of each said tapered bottom acting to compress and deaerate elastomeric stock, the deeper downstream region of each said tapered bottom permitting fluid deaerated from the elastomeric stock to advance downstream to said helical venting path.

3,888,470
METHOD AND APPARATUS FOR AUTOMATICALLY REGULATING THE PLASTICITY OF CERAMIC MATERIAL

Wolfgang Leisenberg, Lich/Hesse, Germany, assignor to Manfred Leisenberg KG Industrifeuerungen, Germany

Filed Apr. 8, 1974, Ser. No. 459,009
Claims priority, application Germany, May 26, 1973, 2326969
Int. Cl. B29b 1/06
U.S. Cl. 259—191 **14 Claims**



1. A method of controlling the plasticity of ceramic material in a production chain in which a mixer is fed raw material and feeds an extrusion press having an extrusion head, the mixer and the extrusion press being driven by respective prime movers, comprising the steps of:

generating a first signal indicative of the power consumption of the mixer prime mover;

generating a second signal indicative of the plasticity at the extrusion head;

comparing the second signal with a reference, third signal, representing desired plasticity, to obtain a correction signal;

combining the first and correction signals to obtain a corrected first signal;

comparing the corrected first signal with a reference fourth signal, representing desired power consumption, to obtain a fifth signal; and

adding moisture controlling substances to the mixer in accordance with the magnitude of the fifth signal.

3,888,471
APPARATUS FOR THERMALLY TRANSFORMING METAL PARTS

Lester Coch, Northport, N.Y., assignor to Waldes Kohinoor, Inc., Long Island City, N.Y.

Division of Ser. No. 105,932, Jan. 12, 1971, Pat. No. 3,756,871. This application Apr. 5, 1973, Ser. No. 348,091
Int. Cl. C21d 1/46
U.S. Cl. 266—4 A **19 Claims**

1. A system for thermally transforming metal elements heat treated at an elevated temperature, the system comprising:

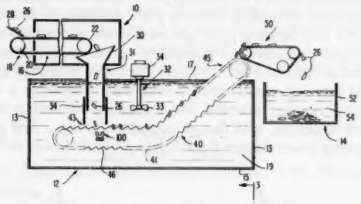
a cooling and isothermal transformation reservoir including a quenching medium;

conveyor means for transporting metal elements from a conveyor loading station positioned within said quenching medium to a conveyor unloading station positioned externally of said medium;

guide means for guiding the metal elements heat treated at an elevated temperature from a location externally of said

quenching medium toward said loading station of said conveyor means; and

magnetic flux producing means, positioned within said quenching medium adjacent said loading station, for controlling the holding time of the metal elements at



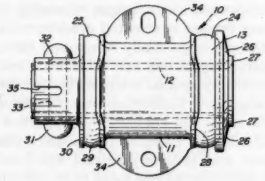
quench temperature within said quenching medium by magnetically attracting the guided metal elements onto said conveyor means at said loading station so as to assist in positioning of the metal elements on said conveyor means.

3,888,472

SUSPENSION INSERT FOR A TWO-HEADED RESILIENT BUSHING

A. J. Hofmann, Frankfurt, Ind., assignor to The General Tire & Rubber Company, Akron, Ohio

Filed Apr. 25, 1974, Ser. No. 463,955
Int. Cl. F16f 1/38
U.S. Cl. 267—57.1 R **8 Claims**



1. In a two-headed resilient bushing of the type including a rigid outer member, a rigid inner member concentrically disposed within said outer member, a first retainer member, a second retainer member, and a suspension insert including two end heads and mounted in radial compression and elongation between said inner member and said outer member with each of said heads respectively mounted between each of said retainer members and said outer member at the ends of said outer member, an improved suspension insert comprising:

A. A suspension insert of an elastomeric composition having (i) a generally cylindrical central body part of annular shape with inner and outer peripheries and adapted to be mounted in radial compression and under at least about 30% elongation between said inner member and said outer member and, (ii) first and second end parts axially positioned at opposite ends of said body part as integral portions of said body part;

B. said first head part having when unstressed (i) an outer periphery larger than the outer periphery of said body part, (ii) an inner periphery at least about as large as said body part, and (iii) a volume at least as large as the desired volume of a first stressed and formed head of said desired resilient bushing; and

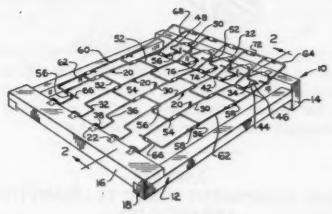
C. said second head part having when unstressed (i) an outer periphery at least about as small as the outer periphery of said body part, (ii) an inner periphery smaller than the inner periphery of said body parts and annularly tapered at one end thereof to integrate with the interior of said body part at an angle of less than about 50°, and (iii) a volume at least as large as the volume of a second stressed and formed head of said desired resilient bushing.

3,888,473

SEAT SPRING ASSEMBLY

Jack C. Mandusky, and Neville L. Riddle, both of Lexington, Ky., assignors to Hoover Ball and Bearing Company, Saline, Mich.

Filed Jan. 26, 1973, Ser. No. 327,142
Int. Cl. A47c 23/04
U.S. Cl. 267—102 **5 Claims**



1. For use with a pair of spaced frame rails, a seat spring assembly comprising a plurality of transversely spaced main springs extending longitudinally between said rails, said main springs including means at the ends thereof for securing said springs to said rails, each of said springs having an intermediate body portion and end portions at least one of which is of zigzag shape, said intermediate body portion being comprised at least partially of a straight length of wire extending lengthwise of said spring, a plurality of tie wires connected to and extending between said intermediate body portions of said main springs, said tie wires extending generally perpendicular to said main springs and being spaced apart in a direction lengthwise of said springs, each of said tie wires including portions parallel to and adjacent said spring intermediate portions, clip means connecting said parallel tie wire and spring portions, said springs and tie wires being provided in sufficient numbers to form a spring deck which can be conventionally padded to provide a seating surface, said zigzag shape end portion including a pair of torsion bars and a connecting bar extending therebetween, a border wire having side portions parallel to said main spring intermediate portions and an end portion spaced above said zigzag spring end portions and extending between said side portions, and a plurality of uplift springs, each of said uplift springs being secured at one end to said border wire end portion and having a torsion bar at the opposite end affixed to a torsion bar on one of said main springs.

3,888,474

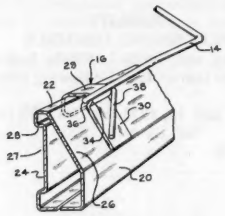
FRAME AND SPRING ASSEMBLY FOR FURNITURE AND THE LIKE

Jack C. Mandusky, and George F. Janko, both of Lexington, Ky., assignors to Hoover Ball and Bearing Company, Saline, Mich.

Filed Mar. 11, 1974, Ser. No. 449,956
Int. Cl. F16f 3/00, 3/02
U.S. Cl. 267—110 **6 Claims**

1. In a frame and spring assembly, a frame rail having a top, an inner side and an outer side, said outer side being indented so as to form a generally downwardly facing surface thereon, a spring supporting clip slideably supported on said rail, said clip having a top portion hooked over the top of said rail and engaged with said surface and having a downwardly and inwardly inclined spring support leg located on the inner side of said rail, said clip having spring retainer means formed

thereon at the upper end of said leg for retaining a spring in a supported position on said leg, said clip being engaged with said rail inner side at a position below said spring retainer means so that downward forces exerted on said leg by a spring



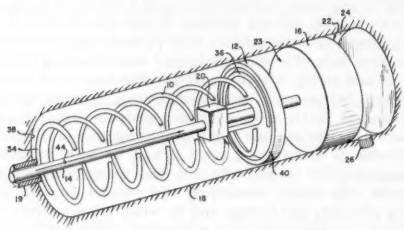
supported on said clip will tend to hold said clip in a pre-established position on said rail, and a spring member having a torsion bar nested in said spring retainer means and an end portion engaged with the top side of said leg.

3,888,475

AXIAL COMPONENT FORCE TRANSMITTING ARRANGEMENT

Robert F. Cericola, Greenville, S.C., assignor to The United States of America, Washington, D.C.

Filed Feb. 27, 1974, Ser. No. 446,442
Int. Cl. F16z *1/12*
U.S. Cl. 267—174 **10 Claims**



1. A device for exerting axial force upon an element adapted to move in an axial direction while minimizing non-axial force on said element comprising:

a stationary surface disposed so that an axis perpendicular to said surface is substantially colinear with said axial direction;

a seat disposed between said element and said stationary surface;

a linear actuator having both axial and non-axial force components and having an intended axial force axis that is coaxial with said axial direction,

said linear actuator positioned between said stationary surface and said seat,

said linear actuator having one end engaging said stationary surface and having its other end in engaging said seat; and gimbal means connected between said seat and said element acting to transmit only axial components of force to said element.

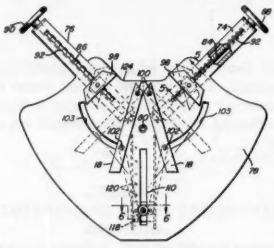
3,888,476

VARIABLE DEGREE VICE

Glen B. Barton, P.O. Box 127, Calhoun City, Miss. 38916

Filed Oct. 31, 1973, Ser. No. 411,202
Int. Cl. B25b *1/22*
U.S. Cl. 269—41 **2 Claims**

1. In combination, a base including a pair of upstanding generally parallel flange means, a horizontal bearing plate means secured across the upper ends of said flange means, a horizontal brace extending between and secured to the portions of the upper end portions of said flange means spaced below the upper terminal ends thereof with said brace spaced below said bearing plate means, a generally horizontal turntable overlying said bearing plate means and pivotally supported therefrom by means of vertical pivot fastener means secured through said turntable, bearing plate means and brace, said turntable and bearing plate means including coacting retaining means operative to releasably retain said turntable in selected predetermined angularly displaced positions relative to said bearing plate means, said base including a lower mounting portion adapted for stationary mounting from a support structure, said flange means including a first pair of upstanding lower flanges fixed relative to said lower mounting



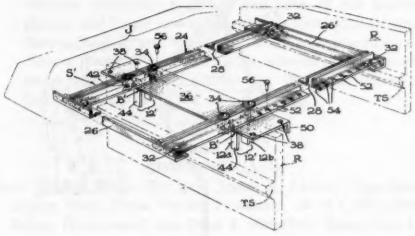
portion and a second pair of upper upstanding flanges between which said brace is secured, means pivotally securing corresponding pairs of said flanges together for relative oscillation about coinciding horizontal axes, means connected between said upper and lower flanges releasably retaining said upper and lower flanges in selected predetermined angularly displaced positions, a generally horizontal table, mounting means stationarily supporting said table from and above said turntable in vertically spaced relation relative thereto, a pair of relatively angulated horizontal arms overlying the upper surface of said table and oscillatably supported at adjacent ends from said table for swinging of the other pair of ends of said arms about axes generally normal and fixed relative to said table and arms toward and away from a line bisecting the included angle formed by said arms, and a pair of followers guidingly supported from said table and spaced outwardly from the remote sides of said arms for movement toward and away from the latter along paths disposed at generally right angles relative to each other and generally equally angulated relative to said line, said followers having abutment blocks overlying the upper surface of said table and pivotally supported from said followers for relative angular displacement about axes generally paralleling the axes of swinging movement of said arms, said abutment blocks including abutment surfaces opposing the remote sides of said arms, feed means operatively connected between said table and said followers for adjustably displacing said followers along said paths, said mounting means including a pair of tubular sleeves extending along said paths and sandwiched between, rigidly secured to and horizontally spacing said turntable and table, said feed means including a threaded feed screw journaled longitudinally in each sleeve, said follower means being threaded on said feed screws, said table including elongated slots formed therein extending along said paths, said followers including upwardly projecting pivot pin portions projecting through and slidingly received in said slots, said abutment blocks being oscillatably mounted on said pivot pin portions, said table further including arcuate slots formed therein having the axes of oscillation of said arms as their centers, depending pivot fastener means carried by the remote ends of said arms and projecting downwardly through said arcuate slots, actuating links disposed in the space between said table and turntable and having a first pair of ends pivotally attached to the lower

portions of said pivot fastener means projecting below said table, a straight slot formed in said table generally bisecting the included angle of said arms, a slide member guidingly and slidingly received in said straight slot and including portions projecting above and below said table, the other pair of ends of said actuating links being pivotally attached to the portion of said slide member projecting below said table for equal and opposite angular displacement of said arms relative to said table in response to oscillation of said slide member in said straight slot, the spacing between said table and turntable providing operating space for said actuating links below said table.

3,888,477
SPACING TOOL

John F. P. Tate, 2819 Westhampton Avenue, S.W., Roanoke, Va. 24015

Continuation-in-part of Ser. No. 382,657, July 26, 1973, Pat. No. 3,813,831. This application Apr. 11, 1974, Ser. No. 460,197
Int. Cl. E04f *21/26*
U.S. Cl. 269—82 **12 Claims**



1. A jig for use in uniformly installing in sloping terrain preformed step riser elements of stairs fabricated from preformed interfitting riser and tread elements, said riser and tread elements each comprising generally planar rectangular members of predetermined thickness and having opposed generally planar faces, said jig comprising:

a. support means including a support member disposed for horizontal disposition, having one end constituting an index end portion from which to progressively gauge a predetermined spacing of said riser elements commencing from an initial starting point working down the slope and from each subsequently installed riser element;

b. riser-element-positioning bracket means dependingly attached transversely to said support member at a predetermined distance from said index portion end, said distance corresponding essentially to the selected tread distance of the steps being installed;

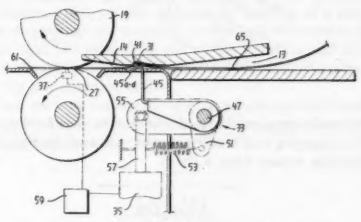
c. said bracket means comprising at least a first pair of laterally spaced bracket members each having linear portions spaced substantially the same distance from said index end portion, said linear portions being spaced laterally apart to attain coplanar engagement with at least portions of one common face of said riser elements to establish the spacing thereof from said index end portion and in an upright riser manner; and

d. the related stair installation including using riser elements having substantial extra height in excess of the finished step riser height, wherein a lowermost portion of each riser element is to be embedded within narrow excavated trenches, which lowermost portions are packed preferably with gravel and/or granular fill; and said riser-element-holding bracket means of said jig including a template having four strategically spaced apart holes, with two holes each disposed near laterally opposite sides of said support member so as to define by marking therethrough length and width corner limits of a predetermined size trench having a plan view greater than the thickness of said riser element, and within which said riser element is to be embedded generally centrally relative to the length and width of said trench.

3,888,478
SHEET LIMITER

Albert D. Alderman, Jr., Skippack, and Gabriel B. Cherian, York, both of Pa., assignors to Sperry Rand Corporation, New York, N.Y.

Filed May 23, 1974, Ser. No. 472,743
Int. Cl. B65h *5/00, 7/20*
U.S. Cl. 271—8 R **5 Claims**



1. A sheet-feed control mechanism to be used with a sheet processing apparatus which is designed to accept one sheet at a time and which cannot accept a subsequent sheet until a previous sheet has been processed to a predetermined degree, said sheet feed control mechanism comprising:

a guide means for defining a sheet entrance path and for guiding sheets inserted into said sheet processing apparatus along said sheet entrance path, said guide means defining a shoulder surface laterally disposed to said sheet entrance path and facing the direction from which sheets are inserted into said sheet entrance path;

a movable stop means positioned adjacent said sheet entrance path opposite said shoulder surface, said movable stop means being selectively movable into said sheet entrance path for directing the leading edges of sheets thereafter inserted into said sheet entrance path against said shoulder surface but for allowing a previously inserted sheet to continue to move beyond said shoulder surface, and movable out of said sheet entrance path for allowing sheets to pass said shoulder surface without the leading edge thereof being directed toward said shoulder surface;

a sensing means for sensing the position of sheets traveling along said sheet entrance path;

a motivating means coupled to said sensing means for selectively moving said stop means into and out of said sheet entrance path in response to said sensing means sensing the locations of said sheets.

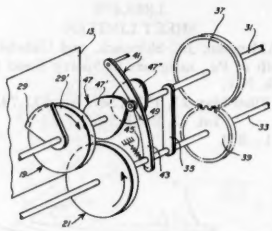
3,888,479
SHEET FEEDING MECHANISM

Hans Eder, Goethering; Heinz Meier, Berlin, and Arend Richter, Nurnberg, all of Germany, assignors to Triumph Werke Nurnberg A.G., Nurnberg, Germany

Filed Dec. 6, 1973, Ser. No. 422,252
Claims priority, application Germany, Dec. 23, 1972, 22633869
Int. Cl. B65h *3/34*
U.S. Cl. 271—22 **6 Claims**

4. In a mechanism for sequentially feeding a stack of sheets in a feeding direction of the type having an end stop and holding means for holding a stack of sheets, retracting means rotatably mounted and driven in the direction opposite the feed direction to retract a sheet from said end stop, and feeding means rotatably mounted and driven in the feed direction

to feed said sheet past the end stop wherein said retracting means and said feeding means are connected in timed relationship to cooperatively retract a sheet from said end stop and then feed the sheet past the end stop, the improvement comprising:



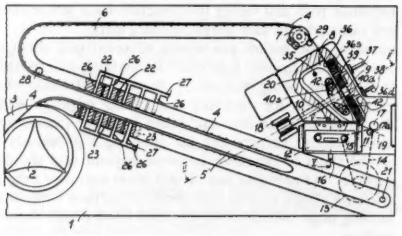
a pivotally supported arm connected to said feeding means for engaging said feeding means with and disengaging said feeding means from a sheet.

3,888,480

APPARATUS FOR LOADING A MAGNETIC TAPE INTO A CASSETTE

Ottaviano Clerici Bagozzi, Via Colautti, 1, Milan, Italy (20125)

Continuation-in-part of Ser. No. 223,277, Feb. 3, 1972, abandoned. This application Dec. 13, 1973, Ser. No. 424,597
Claims priority, application Italy, Feb. 9, 1971, 20319/71
Int. Cl. B65h *19/20*
U.S. Cl. 242—56 R **9 Claims**



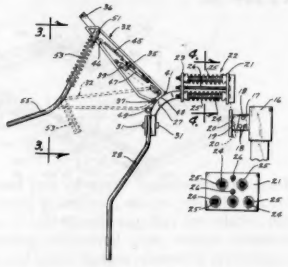
1. An apparatus for cutting, splicing and winding a magnetic tape into a cassette, comprising a support for positioning the cassette, means for extracting the leader of the tape already contained within the cassette through an opening of the cassette, positioning means for said leader and said magnetic tape including pivotable members having suction holes for holding said leader and said magnetic tape, means for cutting said leader and said magnetic tape held by said positioning means, means for splicing a free end of said leader respectively to a free end of said magnetic tape, after cutting, means for advancing and winding the magnetic tape into said cassette after splicing, means for controlling the winding speed and tension of said magnetic tape and means for removing said cassette from said positioning support, wherein, according to the improvement, said means for extracting the leader of the tape already contained within the cassette comprise a chamber having a height substantially equal to the height of said magnetic tape and of said leader and lateral walls defining a contour of length substantially equal to the length of said leader, an opening in said chamber opposite and proximate to said opening of the cassette positioned on said support, the height of said opening being substantially equal to the height of said tape leader, at least one hole in said chamber, and means for creating a vacuum within said chamber through said hole for the extraction of said leader from said cassette, and wherein said positioning means comprise pivotable members arranged within said chamber proximate to a portion of said lateral walls of said chamber and means for moving said pivotable members between a rest position spaced from said portion and an operative position contacting therewith, and suction holes arranged in said portion and means for creating a suction through said suction holes for holding said leader and said magnetic tape during cutting and splicing thereof when said pivotable members are in said operative position.

3,888,481

TRAINING AND PRACTICING APPARATUS FOR WRESTLING

Edward Adams, Jr.; Carl Adams, and Ronald Adams, all of 660 Pineaire Dr., Bayshore, N.Y. 11706

Filed Sept. 16, 1974, Ser. No. 506,275
Int. Cl. A63b *69/00*
U.S. Cl. 272—83 R **17 Claims**



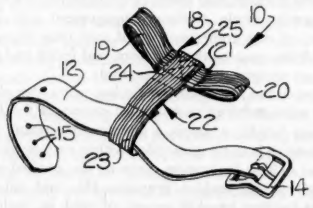
1. A wrestling practice device comprising:
support means;
a base member resiliently mounted to said support means;
leg shaped members attached to said base and extending downwardly therefrom;
a body section pivotally connected to said base member, said body member having a first position extending substantially vertically and a second position extending substantially horizontally; and
means for biasing said body section to said first position.

3,888,482

BASEBALL PITCHER'S TRAINING DEVICE

Herman P. Starrett, 2609 Carolyn Dr., Statesville, N.C. 28677, and George D. Bamberger, 2120 Forest Ridge Rd., Timonium, Md. 21093

Filed Mar. 7, 1974, Ser. No. 448,908
Int. Cl. A63b *69/40*
U.S. Cl. 273—26 C **6 Claims**



1. A training device useful in assisting an athlete develop the ability to properly throw a baseball or the like, and comprising a band adapted to fit about the wrist of a wearer,

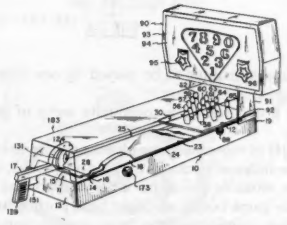
means for interconnecting two spaced fingers on the hand of a wearer and comprising a first loop adapted to encircle the base of the thumb of a wearer, a second loop adapted to encircle the base of another of the fingers of a wearer, and an elastically stretchable bridging strap of a length to extend across the palm of a wearer's hand from the thumb to the third finger and connected to and substantially spacing said first and second loops, such that the first loop encircles the base of the thumb while the second loop encircles the base of the third finger on the same hand of a wearer and with the third finger being laterally drawn toward the thumb to thereby draw the hand into a somewhat cupped configuration, and

an elastically stretchable connecting strap interconnecting said wrist band and the medial portion of said bridging strap and adapted to extend along the inside of the hand of a wearer so as to be directed toward the first and second fingers of the hand of a wearer, said connecting strap being fixedly connected to said medial portion of said bridging strap to preclude slippage of the connecting strap toward the thumb during use and being of a length to draw said bridging strap forwardly toward said wrist band when the device is positioned on a wearer's hand to thereby resiliently maintain the base of the encircled thumb and finger and the wrist in a somewhat forwardly flexed position and while permitting restrained rearward flexure of such fingers and wrist, whereby the connecting strap will tend to forwardly flex the wrist during the throwing motion.

3,888,483
BOWLING GAME

Fred Adickes, Playa Del Rey; James R. Livesey, Hawthorne; George Weir, Palos Verdes Peninsula, all of Calif.; Dennis Bailey, Greenwood, and John J. Mehelich, Booneville, both of Ark., assignors to Wolverine Toy Company, Booneville, Ark.

Filed Oct. 16, 1974, Ser. No. 515,432
Int. Cl.[2] A63D *3/02*
U.S. Cl. 273—38 **19 Claims**



1. A bowling game comprising:

A. a housing having a bowler position and a pin position;

B. an alley bed positioned in the housing having an elongated curvilinear shape, and extending from the bowler position to the pin position;

C. a pin deck positioned in the housing at the pin position spaced from the alley bed to enable bowling balls to roll along the alley bed from the bowler position and under the pin deck;

D. a plurality of bowling pins separately mounted pivotally on the pin deck in a spaced array, each pin being capable of rotatably moving from a first upright position to a second knockdown position;

E. a plurality of knockdown means separately appended to and through the pin deck, each knockdown means separately contacting a base portion of a corresponding pin when the pin is positioned in the first upright position and capable of causing the corresponding pin to move from the first upright position to the second knockdown position in response to contact of the knockdown means by a bowling ball rolling along the alley bed from the bowler position under the corresponding pin;

F. a ball return means for returning to the bowler position bowling balls rolled along the alley bed from the bowler position to the pin position;

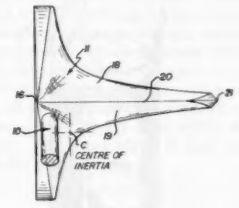
G. a ball rolling member slidably and rotatably positioned in the housing at the bowler position capable of rolling a bowling ball from the bowler position to the pin position, said ball rolling member including (1) a support member slidably and rotatably mounted in the housing and extending therefrom, (2) an arm pivotally mounted on and extending from said support member toward the housing, (3) a ball holder rigidly mounted on the arm at end portions adjacent the housing, said ball holder including a permanent magnet and adapted for holding of a bowling ball on pick-up and releasing such a ball on rotation of the arm, and (4) propelling means for rotating said arm to roll a bowling ball from the ball holder along the alley bed to the pin position; and

F. a ball pick-up means for urging a bowling ball from the ball return means into the ball holder on the arm of the ball rolling member.

3,888,484
GOLF CLUB

Henry D. Zitko, 3860 W. 19th Ave., Vancouver 8, British Columbia, Canada

Filed Dec. 23, 1968, Ser. No. 785,894
Int. Cl. A63b *53/00*
U.S. Cl. 273—80 C **9 Claims**



1. A golf club of the kind which is swung in a plane inclined to the vertical, comprising a shaft, an elongated hand grip on one end of the shaft, a club head on the opposite end of the shaft and having a wide substantially planar ball striking surface, said shaft being inclined relative to the head when the latter is in a normal ball-striking position, said club having a center of inertia when swung through a ballstriking stroke, and said hand grip having an axis lying in a plane normal to the striking surface and including said center of inertia.

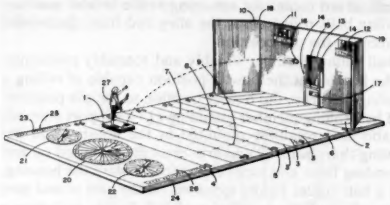
3,888,485
FIELD GOAL GAME TOY

Carl Conti, 5921 Martita Ave., Las Vegas, Nev. 89108

Filed Mar. 21, 1974, Ser. No. 453,287
Int. Cl. A63f *7/10*
U.S. Cl. 273—94 R **4 Claims**

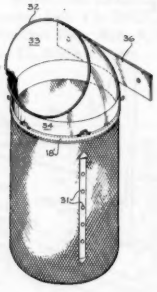
1. A game comprising a game board, a single goal scoring area located at one end of and elevated from said game board, said goal-scoring area consisting of a single pair of goalposts having a defined rectangular receptacle thereabove and therebetween for scoring, a ball, a toy kicker having a movable leg, said kicker being movable to a plurality of locations on said game board, means for holding the ball in front of the spring-operated leg, means associated with said movable leg for urging said leg toward the ball such that the leg can propel the

ball toward the goal-scoring area, first selection means for determining the placement of the kicker on the game board,



and second selection means for use after an attempted kick to determine if the kick must be retried.

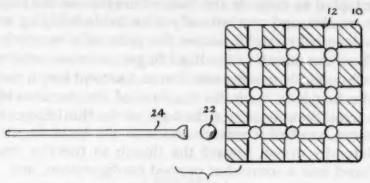
3,888,486
ARTICLE RECEIVING AND COLLECTING RECEPTACLE ASSEMBLY
Robert E. Sutter, 1911 Edgewood Dr., and David T. Mende, 512 Gerard Dr., both of Lodi, Calif. 95240
Filed Apr. 10, 1974, Ser. No. 459,544
Int. Cl. A63b *71/02*
U.S. Cl. 273—105 R **10 Claims**



6. In a room the combination comprising a wall of the room, a member adapted to be secured to said wall and forming an open target for throwing articles therethrough, a container of pliant material having an open end and a closed end, said member being sufficiently rigid to retain its physical shape and to support said container, means coupling the open end of said container to said target member to collect and store articles thrown through said target member, and means other than said open or closed ends forming an access passage into said container for removing articles from within said container.

3,888,487
THREE DIMENSIONAL TIC-TAC-TOE DEVICE
Daniel C. Replogle, 406 Spang St., Roaring Spring, Pa. 16673
Filed Nov. 5, 1974, Ser. No. 521,051
Int. Cl. A63f *3/00*
U.S. Cl. 273—130 AC **9 Claims**

1. In a game device; a body of transparent material, holes extending through said body in each of three directions along the lines of intersection of groups of planes, the planes in each group being parallel and each group extending through said body in one of said directions whereby said holes intersect within the body in groups of three, at least one resilient element slightly larger than a said hole receivable in a hole, and a pusher element operable for pushing said element into a hole and along the hole to a point of intersection of the hole with two other holes and from said point of intersection along one



of the intersecting holes to a next adjacent said point of intersection.

3,888,488
BOARD GAME APPARATUS
Anson Sims, Redondo Beach, Calif., assignor to California R & D Center, Culver City, Calif.
Filed Sept. 3, 1974, Ser. No. 502,385
Int. Cl. A63f *3/00*
U.S. Cl. 273—131 BA **13 Claims**

1. A game apparatus to be played by one or more players comprising in combination:

a game board having a coordinate array of indexed positions;

a plurality of movable game pieces adapted to be positioned on the indexed positions of the game board, at least some of the movable pieces having a base portion for contacting the game board, an upper head portion and a resilient member connecting the base portion and upper head portion to permit the upper head portion to move relative to the base portion; and

means on at least some of the upper head portions for indicating the impact of the upper head portion of one movable piece by the upper head of another movable piece.

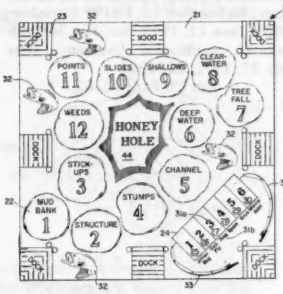
3,888,489
FISHING GAME
Rolland P. Kane, 42 Hadley Dr., Greenhills, Ohio 45218
Filed Feb. 6, 1974, Ser. No. 439,901
Int. Cl. A63f *3/00*
U.S. Cl. 273—134 B **5 Claims**

1. A game, comprising:

A. A playing surface, the playing surface having thereon a plurality of playing locations, each location being distinct from the other locations, each location having an identifier associated therewith, each identifier being different from the other identifiers;

B. Chance means for selecting by chance one of the playing locations, the chance means having a plurality of indexes, the indexes corresponding to the playing location identifiers;

C. A plurality of playing pieces, each piece adapted to be selectively moved to and placed adjacent any of the playing locations and being identifiable from the other pieces and therefore having an identifier associated therewith;



D. A plurality of chance cards, each card having a result noted on one side thereon, each card adapted to be placed upon the playing surface and stacked one on top of the other with the noted result face down; and

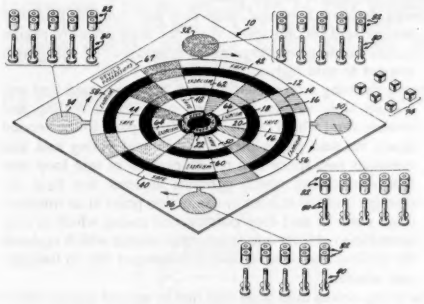
E. Chance means for selecting by chance one of the playing pieces, the chance means having a plurality of indexes, the indexes corresponding to the playing pieces' identifiers identifiers.

3,888,490

BOARD GAME INVOLVING THE CONCEPT OF EXORCISM

Larry G. Kline, 5065 Amestoy Ave., Encino, Calif. 91316

Filed Apr. 8, 1974, Ser. No. 458,693
Int. Cl. A63f *3/00*
U.S. Cl. 273—134 AD **6 Claims**



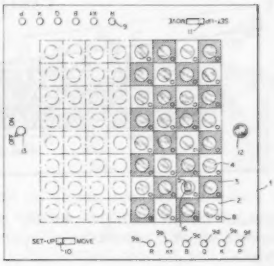
1. A game comprising: A playing board having a playing surface defined by successive discretely delineated spaces, at least some of which have identifying legends thereon having a relationship to playing acts including the legend EXORCISM; sets of marker pieces for individual players to indicate their positions on the playing surface, at least some of said marker pieces comprising a first part and a second part, said first part having a shape to enable it to be placed on and to rest on an individual delineated space of the playing surface, said second part being constructed to have cooperative relationship with said first part, to be associated therewith so that the two parts are movable together as a single marker piece, said second part being colored black to designate possession by the devil and having identification with an EXORCISM delineated space; said second part being removable from the first part to represent exorcism; and chance means manipulatable to determine moves of respective marker pieces.

3,888,491

ELECTRONIC CHESS BOARD AND DISPLAY SYSTEM

Harvey B. Bernard, Reading, and Karl H. Dolle, Swarthmore, both of Pa., assignors to Harvey B. Bernard, Reading, Pa.

Filed Mar. 19, 1974, Ser. No. 452,620
Int. Cl. A63f *3/02*
U.S. Cl. 273—136 A **9 Claims**



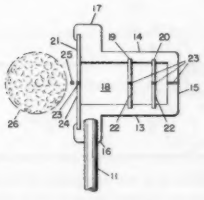
9. An electronic board game consisting of a playing board surface made up of a number of squares, display means for displaying at each of said squares an image of any one of those playing pieces required for the game, logic circuitry to permit each player of the game to selectively cause said images to be automatically transferred from one square to another, and means to selectively create or eliminate said images at preselected squares and wherein said logic circuitry represents the playing piece image by a binary code within the electronic logic of the game, one bit of which is used to identify the player to whom the pieces belong.

3,888,492

GOLF PUTTER WITH TRUE STROKE CHECKING DEVICE

Nat Cabot, 843 Maple Ln., East Meadow, N.Y. 11554

Filed June 19, 1974, Ser. No. 480,812
Int. Cl. A63b *69/36*
U.S. Cl. 273—186 A **2 Claims**



1. A golf club, specifically a putter, comprising:

a. a handle; attached to

b. a head; said head being substantially U-shaped and comprising two sides, a rear body member, with a substantially open main central body; said substantially open main central body being transversed by

c. a forward striking plate;

d. at least one intermediate alignment plate; said forward striking plate and said intermediate alignment plate being

e. rigidly engaged in said head; and

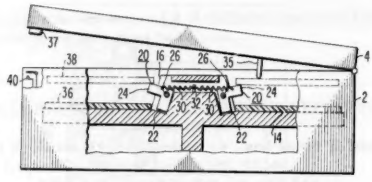
f. an alignment means comprising Vee notches cut into the top surface of said forward striking plate, said intermediate alignment plate and said rear body member.

3,888,493

APPARATUS FOR INHIBITING A PLURALITY OF RECORDS FROM BEING DISPOSED ON A TURNTABLE

Leslie Albert Torrington, and Frederick Roland Stave, both of Indianapolis, Ind., assignors to RCA Corporation, New York, N.Y.

Filed Apr. 22, 1974, Ser. No. 462,769
Int. Cl. G11b *15/00, 3/60*
U.S. Cl. 274—1 R **8 Claims**



1. Apparatus for preventing a plurality of records from being disposed about a spindle on a supporting turntable, comprising:

record engaging means having first and second record engaging portions;

means mounting said record engaging means to said spindle for movement between first and second positions in response to movement of a record along said spindle;

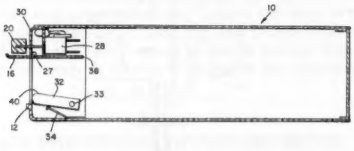
in said first position said first record engaging portion being in the path of a record passed along said spindle with said second record engaging portion out of said record path; in said second position said first record engaging portion being maintained out of said path by a first record disposed on said turntable with said second record engaging portion thereby disposed in the path of a record along said spindle to prevent any further records from being passed along said spindle onto said turntable.

3,888,494

CONTAINER HAVING DISAPPEARING FRONT PANEL

Richard J. Herst, Woodland Hills, Calif., assignor to Car Tapes Inc., Chatsworth, Calif.

Filed Aug. 1, 1973, Ser. No. 384,784
Int. Cl. G11b *1/60*
U.S. Cl. 274—2 **6 Claims**



1. An assembly for housing a tape cartridge and related play-back equipment, comprising in combination:

a tape cartridge housing having an open front portion to permit insertion of a tape cartridge; and

a cover having a first side for substantially covering the open front portion of said housing and a second side having mounted thereon a plurality of control elements associated with the play-back equipment,

said cover being pivotably mounted to rotate in the open front portion of said housing about an axis whose frontward projection traverses a central region of the first side of said cover in its outwardly disposed position before said tape cartridge has been inserted,

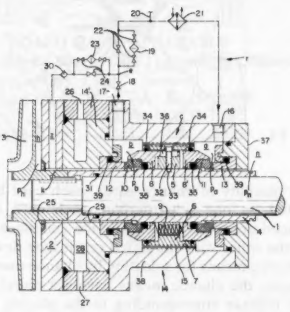
said cover being forced to pivot by insertion of a tape cartridge to a portion in which said control elements mounted on said second side of said cover are exposed for use in said open front portion of said housing.

3,888,495

DUAL-COOLED SLIDE RING SEAL

Ehrhard Mayer, Birkenallee 13, D8191 Eurasburg, Germany

Filed June 11, 1973, Ser. No. 368,596
Claims priority, application Germany, June 9, 1972, 2228296; July 27, 1972, 2236964
Int. Cl. F16j *15/40*
U.S. Cl. 277—3 **10 Claims**



1. Shaft seal apparatus for securing to a wall of a working fluid container to surround a shaft passing through a hole in said wall from a high pressure region inside said container to a low pressure region outside said container and comprising

means defining a seal casing attached to said wall,

means defining a first space situated in the seal case and sealed from the low-pressure region by a first slide ring and counter ring pair,

means defining a second space,

means defining a second slide ring and counter ring pair sealing said second space from the high-pressure region means forming an overpressure in said second space with respect to said high-pressure region,

means defining a recirculation loop bypassing said first and second slide ring-counter ring pairs for a sealing and cooling fluid which connects the first space to the second space via said pump means within said casing and also connects said space in a return portion of said loop outside said casing which contains at least one heat exchanger and has at least one injection point at an intermediate point of said loop outside said casing which is connectable to at least one pressurized source which replaces the sealing and cooling fluid that escapes due to leakage, and wherein

the pump drives fluid from said first to second spaces within said casing and from said second to first spaces outside the casing,

the pump discharge pressure is greater than the provided overpressure ($p_b - p_h$) of the second space with respect to the high-pressure region and the high-pressure region comprises at least a portion of said pressurized sources, the portion of said recirculation loop outside said casing comprises flow resistances which cause a pressure drop ($\Sigma\Delta p$) which is at least equal to the provided overpressure ($p_b - p_h$) and is smaller than discharge pressure of the pump, and

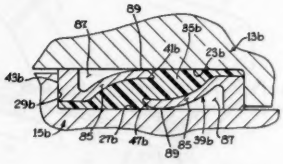
the recirculation loop further comprises flow resistance between the injection point and the second space which

generates a pressure drop corresponding essentially to the rp provided overpressure ($p_b - p_h$).

3,888,496
CAPTIVE SEAL WITH RETAINERS LOADED AGAINST NON-PARALLEL SURFACES

Eldon O. Dryer, Malibu, Calif., assignor to W. S. Shamban & Co., West Los Angeles, Calif.

Filed May 3, 1973, Ser. No. 357,068
Int. Cl. F16l *21/02*
U.S. Cl. 277—117 **4 Claims**

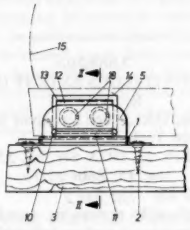


1. A captive sealing assembly comprising:
a seal ring of deformable sealing material;
first and second retainer rings positionable in engagement with said seal ring on opposite sides thereof;
each of said retainer rings having an inclined surface confronting the seal ring, each of said inclined surfaces being inclined in cross section with respect to the axis of the seal ring;
each of said retainer rings being sufficiently stiff to be capable of deforming said seal ring; and
at least one of said retainer rings including a base remote from said seal ring and a resilient arm integral with said base and projecting toward said seal ring, said resilient arm including an inclined section defining at least a portion of said inclined surface of said one retainer ring, said arm and said base defining a recess into which the arm can be resiliently deformed.

3,888,497
SAFETY SKI BINDING

Johann Zahradka, Lassallestrasse 30/21, Wien, Austria

Continuation of Ser. No. 866,228, Oct. 14, 1969, abandoned. This application Nov. 8, 1971, Ser. No. 196,585
Claims priority, application Austria, Oct. 15, 1968, 10040/68; Sept. 9, 1969, 8565/69
Int. Cl. A63c *9/08*
U.S. Cl. 280—11.35 T **6 Claims**

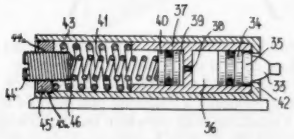


. A safety ski binding which, upon the placing of a ski boot on a ski, automatically effects the connecting thereof by a coupling, said coupling being adapted to be disconnected intentionally by actuation of a release and unintentionally upon the occurrence of a force which is dangerous for the leg of the skier, and comprising a retaining means secured to said ski and a retaining means secured to said boot, an intermediate element positioned between and releasably connected to both said retaining means, a catch element connected to said intermediate element, said catch element serving as additional connection between ski boot and ski, and means on both sides of said intermediate element providing for a separate point of disconnection of the coupling, one of said points serving for the intentional opening of the binding and the other for the unintentional opening of the coupling.

3,888,498
RELEASABLE SKI BINDING

Ulrich Gertsch, Matten, and Valentin Balass, Zurich, both of Switzerland, assignors to Gertsch AG, Interlaken, Switzerland

Filed Nov. 9, 1973, Ser. No. 414,424
Claims priority, application Switzerland, Nov. 15, 1972, 16594/72
Int. Cl. A63c *9/08*
U.S. Cl. 280—11.35 T **17 Claims**

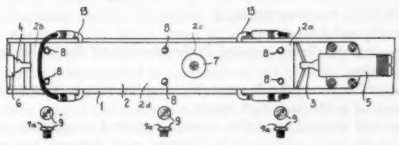


1. A releasable ski binding comprising a housing means, a locking element which is displaced back against spring force during release out of its holding position mounted in said housing means, a displacement element, said locking element being operatively coupled with said displacement element, means for providing two compartments defining a first compartment and a second compartment containing a fluid medium, means providing a throttle location for flow communicating with one another said two compartments, said displacement element immersing into one of said two compartments, a first spring coupled with the displacement element by means of the fluid medium in the first compartment and a second spring coupled with the displacement element by means of the fluid medium in both compartments.

3,888,499
RELEASABLE SKI BINDING

Ernst Gertsch, Wengen, and Ulrich Gertsch, Interlaken, both of Switzerland, assignors to Gertsch AG, Interlaken, Switzerland

Filed Apr. 23, 1973, Ser. No. 353,296
Claims priority, application Switzerland, May 15, 1972, 7203/72
Int. Cl. A63c *9/08*
U.S. Cl. 280—11.35 K **7 Claims**



1. A releasable ski binding for use with a ski and a ski boot having a heel, sole and bottom tread, comprising a release plate, anchoring means for releasably anchoring the release plate at its ends to the ski, support means for the ski boot provided on the top surface of the release plate acting against the bottom tread of the ski boot for enabling adjustment of the inclination of the ski boot relative to the ski in the lengthwise direction of the ski and canting of the ski boot relative to the ski in the transverse direction of the ski, and adjustable holding means for the heel and sole of the ski boot mounted on said release plate for adapting the holding means to the assumed inclination and canting of the ski boot brought about by the action of the support means.

3,888,500

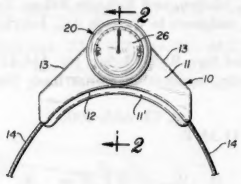
POSITION INDICATING DEVICE FOR ATTACHMENT TO A SKI BOOT

Armand J. Gauthier, 1018 W. 7th St., Hastings, Nebr. 63901

Continuation-in-part of Ser. No. 160,629, Nov. 9, 1971, abandoned. This application Apr. 10, 1974, Ser. No. 459,793

Int. Cl. A63c *11/00*

U.S. Cl. 280—11.37 E **8 Claims**



1. A position indicating device attachment for ski boots for developing foot control of the wearer, comprising

a. a main base shaped to fit the toe of a ski boot,

b. a dial unit including a magnetic dial marked to indicate angles, a rotatable shaft on which the dial is mounted for rotation with the shaft, a housing enclosing the magnetic dial, a dial unit base on which the housing is mounted, and a pointer fixedly mounted above the dial,

c. a swivel joint mounted in the main base and connected to the base of the dial unit, and

d. means attaching the device to a ski boot.

3,888,501

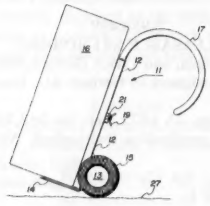
HAND TRUCK AND WHEEL-BARROW COMBINATION

Vernon H. McChesney, 3314 Dumas St., San Diego, Calif. 92106

Filed Mar. 27, 1974, Ser. No. 455,118

Int. Cl. B62b *1/12, 1/20*

U.S. Cl. 280—47.18 **1 Claim**



1. A hand truck comprising:

a truck bed frame;

a loading platform coupled to the bottom of the truck bed portion;

first and second wheels rotatably coupled to a bottom poortion of said truck bed frame;

first and second hhandles attached to and projecting upwardly from said truck bed frame, said first and second handles being substantially circular and more than 180° in arcuate length;

a mounting bar adjustably coupled to the truck bed frame; a wheelbarrow tub removably coupled to said mounting bar; and

first and second parallely disposed races carried by the undercarriage of said truck bed frame;

first and second nuts slidably carried by said first and second races, respectively;

first and second apertures in said mounting bar disposed over said first and second nuts; and

first and second wing bolts passing through said first and second apertures, respectively, and in threadable engagement with said first and second nuts, respectively.

3,888,502

ENERGY ABSORBER COMPONENTS FOR USE IN VEHICLES PARTICULARLY MOTOR VEHICLES

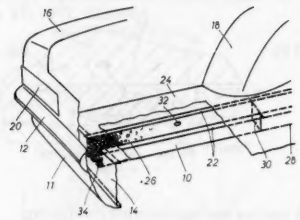
Bertold Felzer; Klaus Brunk, both of Russelsheim/Main, and Friedhelm Kraemer, Hochheim, all of Germany, assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 23, 1973, Ser. No. 344,445

Claims priority, application Germany, May 8, 1972, 2222557; Aug. 11, 1972, 2239485

Int. Cl. B62d *21/00*

U.S. Cl. 280—106 R **2 Claims**



1. An energy absorbing structural component for a vehicle comprising, in combination, an elongated enclosed hollow member comprising a plurality of planar longitudinally extending side walls integrally joined by end walls, said side walls being formed of plastically deformable sheet metal collapsible into generally uniform longitudinally adjacent accordion folds under longitudinal impact loads applied to said side walls by one end wall and absorbing the energy of such impact loads by such plastically deformable collapse, and compressible plastic foam encased within and substantially filling said member, said impact loads being applied by said one end wall generally simultaneously to said compressible plastic foam and to said side walls to initiate said collapse of said side walls and compress said plastic foam, said compressed plastic foam initially applying outward pressure under said impact loads to said side walls at the area thereof immediately adjacent said one end wall to initiate collapse of this area of said side walls into an accordion fold containing compressed plastic foam while maintaining the remainder of said side walls in substantially original unfolded shape, said compressed plastic foam sequentially applying outward pressure to succeeding immediately adjacent areas of said side walls to sequentially collapse such areas into like accordion folds and absorb the energy of said impact loads with substantially square wave efficiency, the longitudinal extent of said side walls collapsing into folds being dependent upon the level of the impact loads applied thereto.

3,888,503

LIMITING OF CONTINUOUS EXTENT OF INFLATABLE RESTRAINT

Brian K. Hamilton, Utica, Mich., assignor to Allied Chemical Corporation, New York, N.Y.

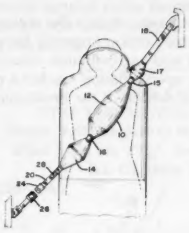
Filed Feb. 22, 1973, Ser. No. 334,804

Int. Cl. B60r *21/10*

U.S. Cl. 280—150 AB **2 Claims**

1. A folded inflatable restraining member for a vehicle safety system comprising a unitary inflatable member folded in uninflated condition to be in the form of a seat belt with frangible means ruptured on commencement of inflation to allow full inflation thereof, said folded member extending in a single pass across the chest of an occupant of the vehicle, said inflatable member comprising at least two fully inflatable sections integral therewith and one intermediate section integral therewith which is inflatable but to a lesser extent than said fully inflatable sections, said unitary member extending across the chest of the occupant to points of connection on the vehicle on either side of the inflatable sections, means capable

of rupturing said frangible means on commencement of inflation of said member in response to a preselected condition of

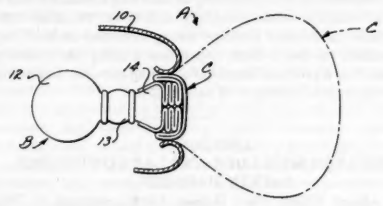


the vehicle, and said first inflatable sections in gas communication with one another via said intermediate portion.

3,888,504
VEHICLE SAFETY DEVICE

Clifford Bonn, Buffalo, N.Y., and Kenneth R. A. Wilson, Redondo Beach, Calif., assignors to Irvin Industries Inc., Greenwich, Conn.

Continuation-in-part of Ser. No. 22,429, March 25, 1970, abandoned. This application Dec. 24, 1970, Ser. No. 101,253
Int. Cl. B60r *21/06*
U.S. Cl. 280—150 AB **4 Claims**



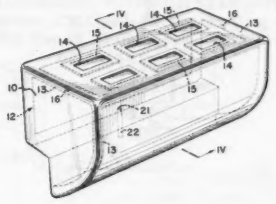
1. An inflatable restraint bag comprising at least in part a woven stretch fabric having a plurality of threads of stretch yarn extending in at least one direction in juxtaposition for elongation of the woven stretch fabric so that inflating fluid permeability of the woven stretch fabric portion of the inflated restraint bag is increased upon occupant impact against the restraint bag, said woven stretch fabric having substantially instantaneous recovery of at least 70% after elongation within the range of differential pressures to which such a restraint bag will normally be subjected so that inflating fluid permeability thereof is decreased upon dissipation of the forces of occupant impact against the restraint bag, the warp of said woven stretch fabric comprising threads of non-stretch yarn and the weft thereof comprising threads of 140-560 denier Spandex fiber wrapped with 2 ends of 210-420 denier high tenacity nylon.

3,888,505
INFLATABLE VEHICLE SAFETY DEVICE

Iwao Shibamoto, No. 31-7, 2-chome, Nishi Sugamo, Tokyo, Japan

Filed Sept. 13, 1971, Ser. No. 179,973
Claims priority, application Japan, Sept. 14, 1970, 45-80327
Int. Cl. B60r *21/10*
U.S. Cl. 280—150 AB **1 Claim**

1. A safety device comprising a bag having folded and expanded positions, a tubular frame secured to said bag, means for introducing a pressurized gas into said tubular frame, said tubular frame being inflatable by said gas to expand said bag from its folded state to its expanded state when the pressurized gas is introduced into said tubular frame, the expansion of said bag producing a pressure differential between the inside and outside of said bag, said bag having a wall with air passage openings for introducing ambient air into the expanded bag under said pressure differential, and check valves on said bag for closing said air passage openings to trap

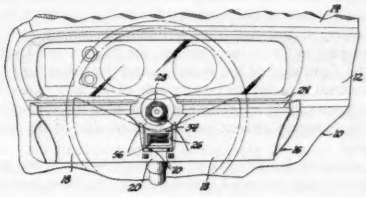


the thus introduced air in said bag, said tubular frame having a wall with weakened portions therein adapted to be ruptured under the pressure of the gas introduced into said tubular frame, the rupture of said weakened portions causing the pressurized gas in said inflated tubular frame to flow into said bag to build up the internal pressure of the bag to a level higher than atmospheric pressure and close said check valves to isolate the interior of the bag from the ambient atmosphere.

3,888,506
OCCUPANT KNEE RESTRAINT

Ronald H. Haas, Okemos, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 10, 1973, Ser. No. 404,877
Int. Cl. B60r *21/04, 21/10*
U.S. Cl. 280—150 B **3 Claims**

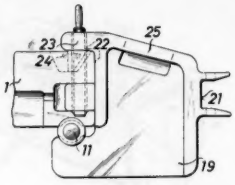


1. In combination with an automotive vehicle including a collapsible energy absorbing steering column assembly engageable by the upper torso of a seated driver to absorb kinetic energy, a knee restraint including plastically deformable first portions located to each side of the column assembly and interconnected by a center portion partially surrounding the lower part of the column assembly and including an aperture opening thereto, closure means of non-plastically deformable frangible plastic material fitting in the aperture and extending adjacent to the lower part of the column assembly, means mounting the closure means on the center portion for movement therewith, deformation of the first portions by the driver's knees absorbing kinetic energy of the lower torso of the driver and applying compressive loads longitudinally of the femurs of the driver to control the kinematics of the upper torso of the driver with respect to the column assembly, the deformation of the first portions moving the center portion upwardly toward the column assembly to move the closure means into engagement with the lower part thereof, the frangible closure means breaking upon such engagement to permit collapse of the column assembly through the knee restraint without interference upon engagement of the upper torso of the driver with the column assembly.

3,888,507
VEHICLE BALLAST WEIGHT ASSEMBLY

Jakob Berghausen, Nievenheim, Germany, assignor to International Harvester Company, Chicago, Ill.

Filed Oct. 21, 1974, Ser. No. 516,568
Int. Cl.[2] B60R 27/00
U.S. Cl. 280—150 E 10 Claims



1. A ballast weight assembly for mounting on the front end of a tractor, comprising:

a generally rectangular prismic-like base weight member connected across the front end of the tractor, the top side of the member having an elongate channel with at least one inclined wall extending upwardly toward the front side of the member and the inclined wall having at least one V-shaped notch also extending upwardly toward the front side of the member, the front side of the member having a centrally located cavity forming a clevis for a hitch, the top side further having a centrally located hole passing into the clevis, and the bottom side of the member having an elongate groove;

a generally rectangular prismic-like first weight mounted on the member, the first weight having a generally U-shaped opening at one side of the prism, one leg of the U having a notch with an inclined wall extending toward the opening of the U and forming a hook with a tip depending into the channel of the member, the inclined wall of the hook having an inverted V-shaped surface mating with the V-shaped notch in the channel, the base of the U abutting the front side of the member and the other leg of the U extending under the bottom side of the mbmer and having a transversely extending groove aligning vertically with the elongate groove in the bottom side of the member; and

an elongate bar passing in the space between the grooves keying the mounted first weight to the base member.

3,888,508
SAFETY APPARATUS FOR STEERING WHEEL ASSEMBLY

Ryohei Kizu; Tadao Muramatu, both of Toyota, and Teruo Kobayasi, Harutti-Mura, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Apr. 13, 1973, Ser. No. 350,784
Claims priority, application Japan, Apr. 19, 1972, 47-39375
Int. Cl. B60r 21/08
U.S. Cl. 280—150 AB 7 Claims

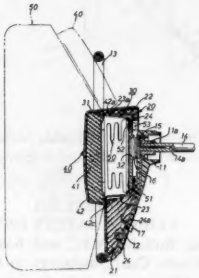
1. A safety apparatus for a steering wheel assembly of a vehicle having a collision sensor and a fluid pressure source for activating said safety apparatus in response to a signal generated from said sensor, comprising:

a pad member including a core cushion on spokes of said steering wheel assembly, said pad member including means defining a chamber in substantially the central portion thereof,

a bag container made of synthetic resin in the shape corresponding to said chamber, said bag container being within said chamber and having, on its bottom portion, an inlet port connected to said pressure source through the steering column assembly for said steering wheel assembly,

an inflatable bag confined air-tightly within said bag container; said inflatable bag being inflated by pressurized fluid from said pressure source through said inlet port in case of vehicle collision,

said bag container further having drain valve means formed by at least one breakable portion normally integral with said bottom portion of said bag container whereby when the pressure in the bag upon inflation reaches a predetermined inner pressure a portion of the breakable portion



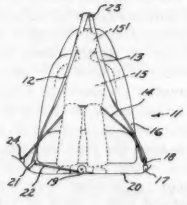
breaks to let any exceeding pressure, above the predetermined pressure, escape out of the inflated bag, and

a cover member having a core cushion formed in the shape corresponding to the opening of said bag container and a cover which overlies integrally said cover member core cushion; said cover member being mounted on said bag container to move from a position closing the opening thereof to a position lateral of said bag container opening in response to inflation of said bag.

3,888,509
BIFURCATED SHOULDER AND LAP CONTINUOUS SAFETY HARNESS

Ronald Albert Willey, Port Huron, Mich., assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Nov. 1, 1972, Ser. No. 302,791
Int. Cl. B60r 21/10
U.S. Cl. 280—150 SB 5 Claims



1. A safety harness for occupants of vehicles comprising:

a floor anchor;

a single length of webbing secured at one end to a retractor and partially extendable and retractable therefrom and thereinto and at the other end said webbing secured to said floor anchor;

an anchor bar above and behind the head of a wearer;

a portion of said webbing intermediate the ends thereof trained to extend upwardly to a slip position on said anchor bar and thence downwardly to form shoulder support loops;

a lap portion extending from said loops and in continuation of said webbing and secured terminally to said floor anchor;

a ring-tongue having tongue portion and a ring portion freely slidable on said webbing intermediate said shoulder support loops and said lap belt portions; and

a receptacle secured to the floor of a vehicle into which the tongue portion of said ring-tongue is lockably and selectively releasable.

3,888,510

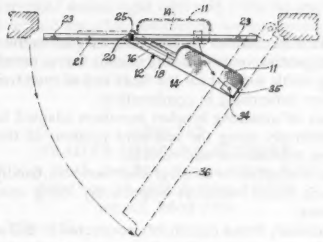
STEP FOR MOTOR VEHICLE

Robert L. Maske, 1405 Broadway St., Iowa City, Iowa 52240

Filed Mar. 25, 1971, Ser. No. 127,967

Int. Cl. B60r *3/02*

U.S. Cl. 280—166 **5 Claims**



1. A step for a motor vehicle, comprising a support bracket adapted to be connected to the body of a motor vehicle, a supporting arm pivotally secured to said support bracket, a step bracket secured to a door of said vehicle, a step pivotally secured to said step bracket, one end of said arm being rigidly connected with said step, and the other end of said arm supported for sliding movement relative to said support bracket, said arm comprising a pair of parallel, spaced-apart elongate members, said members being rigidly connected together at said other end of said arm, and including a vertical pivot shaft depending from said support bracket and passing between said members, and means secured to the bottom portion of said shaft to support said members.

3,888,511

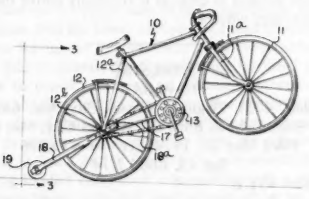
SAFETY DEVICE TO PREVENT TIPPING A BICYCLE

Salvatore C. Parrilla, 811 Literary Rd., Cleveland, Ohio 44113

Filed July 19, 1973, Ser. No. 380,748

Int. Cl. B62d *63/00*

U.S. Cl. 280—239 **1 Claim**



1. A safety device for attachment to a bicycle having a main frame and front and rear wheels to prevent the same being tipped over backward by its rider, said frame having two linear rigid horizontal frame members extending from opposite sides of a pedal sprocket to opposite sides of a rear wheel axle, comprising a pair of rigid struts generally parallel, a rotatable roller connected between said struts at one end adapted to engage the ground when the bicycle is tipped backward, a parallel projection means rigid with and extending from near the opposite ends of said struts with L-shape ends in position to overlie said horizontal frame members respectively, said struts being pivoted to said frame at a point along said projection means on the extended axle of said rear wheel, and a plurality of pairs of spaced registering openings through said projection means in position for varying said attachment to said bicycle frame.

3,888,512

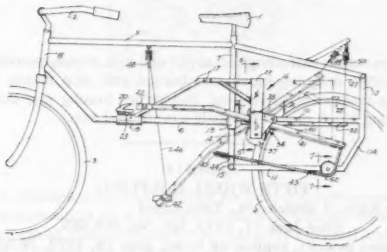
POWER TRANSMISSION WITH ADJUSTABLE FULCRUM

Walter O. Peterson, 875 Classic Pl., Eugene, Oreg. 97401

Filed May 16, 1973, Ser. No. 360,677

Int. Cl. B62m *1/04*

U.S. Cl. 280—255 **12 Claims**



1. In combination with a first-class lever having means associated with the work performing end of the lever for imparting rotary motion to a driven member of a supporting structure, the improvement comprising,

a fulcrum assembly including a fulcrum wheel in toothed engagement with said lever and about which said lever is powered in a rocking manner, keeper means retaining said lever in engagement with the fulcrum wheel during rocking lever motion, said keeper means rockably mounted for movement about the axis of said wheel during lever operation,

a carrier for said fulcrum assembly positionable and lockable fore and aft along a fixed member of the supporting structure to position the fulcrum wheel and said keeper means along said lever to vary the mechanical advantage of the lever, and

means for retention of the fulcrum wheel against rotational forces applied to the wheel periphery during lever operation, said retention means comprising a pinion on said carrier in coaxial alignment with said fulcrum wheel and in toothed engagement with the fixed member, sleeve means interconnecting said pinion and the fulcrum wheel to lock the latter against rotation other than during fore and aft movement of the carrier.

3,888,513

TRACTOR-TRAILER SERVICE LINE COUPLING

Gilbert B. Pilz, Toledo, Ohio, and James R. Vivian, Hoffman Estates, Ill., assignors to Young Daybrook, Inc., Southfield, Mich.

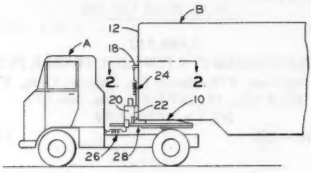
Filed Apr. 29, 1974, Ser. No. 464,781

Int. Cl. B60d *1/08*

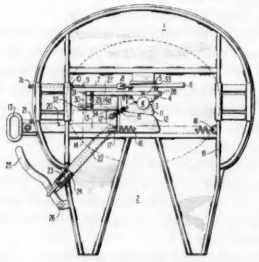
U.S. Cl. 280—421 **16 Claims**

1. A coupling assembly for releaseably interconnecting supply lines of a tractor having a fifth wheel and corresponding supply lines on a trailer having front wall means and a kingpin interengageable with said fifth wheel comprising, mating male and female supply line coupling block members, each said block member including coupling connection means, one of said male and female coupling block members being mounted on said trailer wall means, means supporting the other of said male and female coupling block members on said tractor for mating engagement with said said one coupling block member upon relative movement of said tractor and trailer to bring said fifth wheel and kingpin into interengage-

ment, said fifth wheel having an axis, said supporting means including carrier means supported on said fifth wheel for pivotal movement about said axis, said carrier means including arm means extending radially of said axis, means mounting said other coupling block member on said arm means for sliding movement therealong, and means biasing said other coupling block member to slide toward said axis.



3,888,514
FIFTH WHEEL COUPLING
Haim Klein, 1 Shnizler St., Yafo, Israel
Filed June 11, 1973, Ser. No. 368,589
Claims priority, application Israel, June 28, 1972, 39780
Int. Cl. B62d *53/08*
U.S. Cl. 280—434 **5 Claims**



1. In a fifth wheel coupling mechanism for coupling a trailer to a tractor comprising a plate-shaped body having a concavity which is directed downward and having an entrance slot reaching to approximately the center of said plate-shaped body, the improvement comprising:

a king pin by which the trailer is coupled to a tractor;

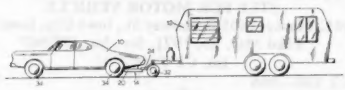
a king pin holding means comprising a hook member and a stationary body, said hook member being pivotably mounted upon said plate-shaped body to extend across said entrance slot and containing a recess for the reception of said king pin, and said stationary body having a recess for the reception of said king pin, said recess of said stationary body faces the recess of said hook member in the coupled position, being urged against said stationary member, said king pin being completely enclosed in the coupled positon by said king pin holding means;

a movable locking wedge slidably mounted on said plate-shaped body urging, in the coupled position, said hook member against said king pin;

two guide rails disposed on said plate-shaped body, wherein said stationary body is slidable and fixable between said two guide rails; and

a wedge bar and a rib wherein said stationary body bears against said wedge bar positioned between said stationary body and said rib extending at a right angle from said guide rails, said wedge bar being slidable into the gap between said rib and said stationary body.

3,888,515
TRAILER HITCH MECHANISM
Charles M. Winter, 2580 W. Philadelphia St., York, Pa. 17404
Division of Ser. No. 314,952, Dec. 14, 1972, Pat. No. 3,834,735. This application Jan. 16, 1974, Ser. No. 433,666
Int. Cl.[2] B60D *7/00*
U.S. Cl. 280—476 R **1 Claim**



1. A hitch mechanism for attaching a trailer to the rear end of an automotive vehicle having chassis frame members and providing stable support for the front end of such trailer, said mechanism comprising in combination:

a. a pair of attaching bracket members adapted to extend respectively along the rearward portions of the chassis frame members of said vehicle,

b. means adapted to connect said members fixedly to said chassis frame members respectively along one surface thereof,

c. an auxiliary frame detachably connected to said attaching bracket members and including a pair of substantially parallel connecting members respectively comprising opposite side members of said auxiliary frame which also includes an auxiliary axle extending between and interconnected to said connecting members for support thereby,

d. auxiliary wheels supported by the opposite ends of said auxiliary axle,

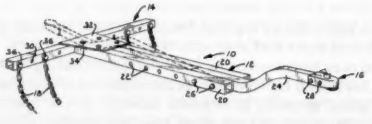
e. spring means connected between said axle and connecting members to absorb shock imposed upon said wheels,

f. transverse members extending substantially horizontally in use between and fixed to said connecting members,

g. one of said transverse members having opposite ends respectively extending downward and forward in use from the transverse intermediate portion thereof and said ends being fixedly connected to said connecting members, whereby the transverse intermediate portion of said one transverse member normally is positioned above and substantially within a common vertical plane extending through the axes of said auxiliary wheels, and

h. a hitch connecting pivot for a trailer supported by said one of said transverse members intermediately between the ends thereof to dispose it vertically above the axes of said auxiliary wheels.

3,888,516
TOW BAR
Lirel G. Holt, 4721 Virginia, Kansas City, Mo. 64110, and Max B. Holt, 7528 E. 83rd St., Kansas City, Mo. 64138
Filed May 24, 1974, Ser. No. 473,196
Int. Cl. B60d *1/14*
U.S. Cl. 280—491 E **5 Claims**



1. A collapsible tow bar for coupling the front of a towed vehicle with the rear of a towing vehicle comprising:

first and second spaced apart elongated arms adapted to extend from the rear of said towing vehicle to the front of

said towed vehicle and each having a plurality of aligned openings along its length;

a third arm received between said first and second arms projecting from one end of said first two arms and having a plurality of openings along its length adapted to be aligned with said openings in said first and second arms; removable fastening means for coupling said third arm with said first and second arms in any one of a plurality of positions and accommodating pivotal movement of said third arm between folded and unfolded positions;

hitch means disposed on said third arm for coupling the latter with the towing vehicle;

a cross tie extending transversely of said first and second arms and rigidly coupled therewith;

pressure plate means rigid with said cross tie and said first and second arms for distributing towing forces; and

flexible fastening means adapted to be coupled with said cross tie in spaced apart locations for securing said cross tie to the towed vehicle.

3,888,517

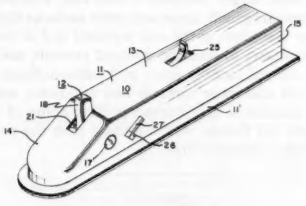
TRAILER HITCHING COUPLER

James D. Ray, Rt. 5, Box 208, Nampa, Idaho 83651

Filed Nov. 16, 1973, Ser. No. 416,697

Int. Cl. B60d *1/06*

U.S. Cl. 280—512 **2 Claims**



1. A trailer hitching coupler, comprising:

a body having a dome being engageable with a hitching ball from below and having a pair of parallelly disposed support walls fastened to the rearwardmost terminal side of said dome, and a top wall being coextensive with and being fastened to the uppermost terminal edges of said support walls and to said dome; and

a shoe assembly including a shoe being mounted on an axle fastened transversely between said support walls distally rearward of said dome, said shoe having a concave curved portion on the upper side of its forwardmost terminal end to mate with the lower curvature of said hitching ball, said dome having an entranceway in its rearwardmost terminal side to permit the forwardmost terminal side of said shoe to project through said dome adjacent said ball, a shoe-aligning tab issuing from the uppermost terminal side of said shoe engageable through a slot in said top wall for pivoting said shoe away from or adjacent to said hitching ball, and a knife-lock sub-assembly having a spring loaded knife-lock engageable with a notch in the rearwardmost terminal end of said shoe to retain said shoe adjacent said hitching ball, said knife-lock being provided on a handle which projects through a second slot in said top wall rearwardly of said slot carrying said tab and being guided by means provided in said body, said knife-lock sub-assembly comprises a substantially L-shaped handle carried rectilinearly in and being guided by a web member fastened to said support walls, a blade fastened transversely to the forwardmost terminal end of said handle to engage said shoe notch, said blade being carried at its terminal sides in slots disposed in said support walls, and a spring disposed about said handle between said blade and said web member to urge said blade and handle adjacent said knife-lock.

3,888,518

FLUID CONDUIT CONNECTING DEVICE

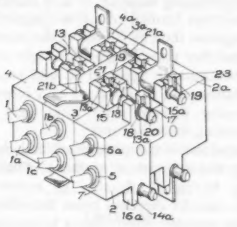
Marcel Delessert, Alens-sur-Cossonay, Switzerland, assignor to Societe Corobit Anstalt, Treuunternehmen, Lichtenstein

Filed Jan. 21, 1972, Ser. No. 219,802

Claims priority, application France, Jan. 21, 1971, 71.02004

Int. Cl. F16l *39/00*

U.S. Cl. 285—39 **5 Claims**



1. Multiple connection device for fluid conduits comprising a juxtaposition of a plurality of pairs of coupled elements, wherein all said elements are substantially identical and each one is formed with orifices on one of its faces and with means for attachment to the ends of said conduits to effect fluid communication between said conduits and respective of said orifices, and the opposite face of each element is provided with a bored male member and a bored female member capable of nesting respectively in a female member and a male member of another identical element so as to form a pair of elements which are interconnected by coupling members, the said element having inner passageways each communicating on one side with one of said orifices and on the other side with a bore in one of said members, each element being provided with means forming slots on two opposite faces with at least two slots situated close to the juxtaposed faces of said elements, the means forming said slots being resiliently deformable whereby said slots receive symmetrical lugs formed with recessed portions adapted to engage opposed surfaces of the means forming said slots to ensure assembly of said pairs of juxtaposed elements, at least two of said lugs forming an axis of rotation on which a fastener is engaged for coupling two of said elements.

3,888,519

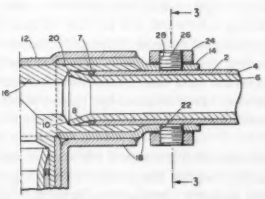
COUPLING AND FITTING FOR LINED TUBING

Verity C. Smith, Dedham, and Lawrence H. Reynolds, Needham, both of Mass., assignors to Vaponics, Inc., Plymouth, Mass.

Filed Nov. 16, 1972, Ser. No. 307,124

Int. Cl. F16l *11/12*

U.S. Cl. 285—55 **10 Claims**



1. In a joint for coupling and fitting; a coupling member having a female receptacle with an inner surface formed of a non-contaminating material to a lined conduit having an inner lining of a non-contaminating material and an outer-tubing formed of a material dissimilar to said non-contaminating

material which is chosen to provide structural support, where the improvement comprises:

said coupling member enclosing a cylindrical segment of said outer-tubing;

said inner lining of non-contaminating material of said conduit extending beyond the end of said outer-tubing;

the non-contaminating material of said female receptacle forming a shoulder within said receptacle;

said non-contaminating lining of said conduit contacting the non-contaminating material of said shoulder;

a sealing member formed of a non-contaminating material abutted against the end of said outer-tubing, said flexible sealing member providing a fluid tight seal between the non-contaminataing material of said receptacle and the non-contaminating material of said inner lining so that fluid flowing through said joint only contacts non-contaminating material; and,

a ring located about the portion of said coupling member enclosing the cylindrical segment of said outer-tubing, said ring having a plurality of symetrically located, threaded, radially directed holes therethrough;

said coupling member also defining holes which are concentrically aligned with the threaded holes in the ring; and, set screws threaded into said threaded holes in said ring and extended through said holes in said coupling member and bearing against the exterior surface of said outer-tubing.

3,888,520

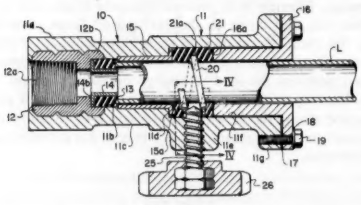
LANCE SUPPORTING COUPLING

James H. Brennan, Monroeville, Pa., assignor to Pittsburgh Brass Manufacturing Company, Irwin, Pa.

Filed Aug. 22, 1974, Ser. No. 499,705

Int. Cl. F16l *37/22*

U.S. Cl. 285—310 **11 Claims**



1. In a simplified positive latching and easily releasable fluid sealing-off coupling for connecting an end portion of a fluid delivering pipe member to a fluid supply line, a longitudinally extending coupling housing having a through-extending bore, connector means at a back end portion of the housing for securely connecting said bore to the fluid supply line, an annular gasket positioned within a back end portion of said bore adjacent said connector means, a pair of sleeve-like members along a forward end portion of said bore for slidably receiving a rear end portion of the pipe member in a longitudinally extending relation therein, means supporting said gasket in position within said bore to define a forwardly exposed end seat portion for a rear edge of the rear end portion of the pipe member, said pair of sleeve-like members defining a central recess portion therebetween within said bore, a ring-like locking element operatively carried within said recess portion and having a pair of spiral wings connected together at one end and adapted to curve about opposite sides of the pipe member to be held, said ring-like element having its wings connected in a flexibly held closely adjacent relation, a canting screw, a threaded boss on said housing in alignment with said recess portion for operatively receiving said canting screw, said canting screw having a canting head adapted to wedge between the wings of said ring-like element and force said wings apart into canted locking engagement with the pipe member positioned within said housing.

3,888,521

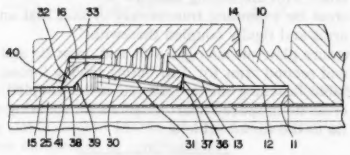
TUBE COUPLING AND FERRULE THEREFOR

Lawrence B. O'Sickey, University Heights, Ohio, assignor to Parker-Hannifin Corporation, Cleveland, Ohio

Filed July 11, 1973, Ser. No. 378,332

Int. Cl. F16l *19/08*

U.S. Cl. 285—341 **4 Claims**



1. A tube coupling ferrule of thin wall having a forward and a rear portion the forward portion having radially inner and outer conical surfaces of different conicity that extend from smaller diameters at the forward terminal end of the ferrule to larger diameters toward the rear portion and which gradually converge toward each other in the direction toward their larger diameters whereby the thickness of the forward portion is least at such larger diameters, said rear portion having generally conical radially inner and outer surfaces that extend from smaller diameters at the rear terminal end of the ferrule to larger diameters toward the forward portion, said ferrule also having curved radially inner and outer surfaces that respectively join said inner surfaces and said outer surfaces at said larger diameters, said curved portion being of substantially uniform but thinner wall thickness than the major part of said forward conical portion.

3,888,522

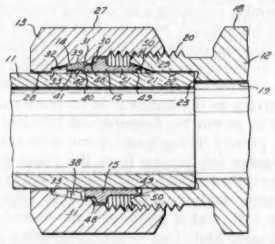
FLARELESS FITTING

Luis Moreiras, Northfield, Ohio, assignor to The Weatherhead Company, Cleveland, Ohio

Filed Apr. 1, 1974, Ser. No. 456,864

Int. Cl. F16l *17/00*

U.S. Cl. 285—341 **13 Claims**



1. In combination, a tube, a body, a nut, a rear sleeve, and a front sleeve, said body including a threaded body portion and a conical body camming surface, said nut including a threaded nut portion for threadably engaging said threaded body portion to axially advance said nut relative to said body from a starting position to a midway position and from said midway position to a tightened position, a conical nut camming surface, and a nut abutment surface, said rear sleeve being annular and including a rear sleeve inner peripheral surface and a rear sleeve outer peripheral surface, said inner peripheral surface including a radially inwardly extending rear sleeve tube cutting edge for cutting into said tube, said front sleeve being annular and being disposed between said rear

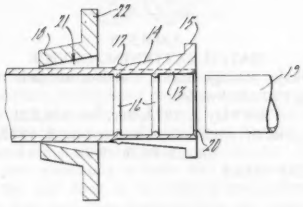
sleeve and said body camming surface and including a front sleeve abutment surface, said nut abutment surface being axially spaced from said front sleeve abutment surface and separating it from said nut camming surface and said nut camming surface engaging said rear sleeve and said front sleeve engaging said rear sleeve to prevent axial movement of said rear sleeve when said nut is in said starting position, said rear sleeve tube cutting edge being radially inwardly embedded in said tube by operation of said nut camming surface and said nut abutment surface lightly engaging said front sleeve abutment surface and said front sleeve engaging said rear sleeve when said nut is in said midway position, and said front sleeve being radially inwardly contracted by operation of said body camming surface and said nut abutment surface tightly engaging said front sleeve abutment surface and said front sleeve being axially spaced from said rear sleeve by operation of said nut abutment surface when said nut is in said tightened position.

3,888,523

NON-THREADED TUBING CONNECTOR

Donald D. Bartholomew, Utica, Mich., assignor to Merit Plastics, Inc., East Canton, Ohio

Filed May 10, 1973, Ser. No. 358,916
Int. Cl. F16l *13/14*
U.S. Cl. 285—382 **4 Claims**



1. In a conductor for a fluid, a tube having a section at one end defined by a circumferentially continuous wall telescopingly insertable over a conduit to which it is to be secured in direct fluid conducting relation therewith circumferentially, spaced outwardly extending integral inclined plane means on said section diverging toward the end thereof, the wall of the section between and under the inclined plane means being deflectable, and a locking sleeve means on said end section slidable over said inclined plane means toward said one end for producing a uniform constriction of said circumferentially continuous wall thereby producing a locking and sealing force between said tube end section and said conduit.

3,888,524

WINTER EMERGENCY BRAKE SYSTEM

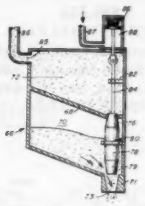
Poy Lee, 52 Tennyson St., Somerville, Mass. 02145

Division of Ser. No. 385,419, Aug. 3, 1973. This application May 28, 1974, Ser. No. 473,590
Int. Cl. B60b *39/04;* **B61h** *11/00*
U.S. Cl. 291—15 **4 Claims**

1. A storage apparatus for sand or the like for use with a motor vehicle to deposit the sand on the roadway adjacent at least one wheel of the vehicle, comprising;

a tank,

means partitioning the tank into upper and lower compartments and defining a port communicating therebetween, said upper compartment having means defining an inlet, said lower compartment having means defining an outlet, and valve means including a closure member that is movable to assume a first position permitting sand deposition and blocking communication between said compartments, and a second position inhibiting sand deposition and permitting said flow between said compartments.

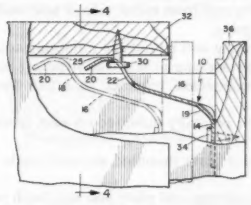


3,888,525

HIDDEN DRAWER AND DOOR LATCH

William L. Kousens, 10834 Hansom Ln., Spring Valley, Calif. 92077

Filed Feb. 6, 1974, Ser. No. 439,902
Int. Cl.[2] E05C *19/06*
U.S. Cl. 292—87 **8 Claims**



1. A resilient metal catch element for preventing opening of drawers or doors in cabinets or the like comprising;

means for providing a rigid projection that projects in a given direction and has a hook edge portion inside a cabinet adjacent a drawer or door,

a metal catch element having a base end for being secured to the inside surface of a drawer or door,

said catch element having a substantially planar portion with an upper surface,

said planar portion and said surface being normal to said given direction,

said planar portion being integral with and extending at an angle from said base end toward the interior of the cabinet and projection means and having an integral end with an upwardly curved portion and a downwardly curved portion relative to the plane of the upper surface of the planar portion,

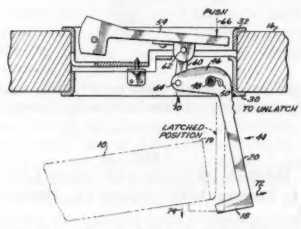
a slot in the upwardly curved portion for passing over the projection means with the projecting means passing through said slot with the hook edge portion hooking through the slot on the upward side in a downward direction and being positively hooked through and locked over the edge of the slot,

said integral catch element being resilient whereby a pressing force against the upper side of the planar portion downwardly will bend the planar portion downwardly moving the slot edge away from hooking contact with the projecting means and allowing the drawer or door to be opened relative to the cabinet,

and said planar portion and said slot having a width that is several times the width of the projection means to assure catching the projection means even where there is slight

misalignment between the projection means and the catch element.

3,888,526
DOOR HOLDER AND RELEASE LATCH
Richard D. Dennis, Lakewood, Calif., assignor to McDonnell Douglas Corporation, Santa Monica, Calif.
Filed Feb. 8, 1974, Ser. No. 440,678
Int. Cl.[2] E05C *3/30, 13/04, 15/02*
U.S. Cl. 292—97 **6 Claims**



1. A door holder and release latch for mounting in an opening in a wall structure to retain a first pivotal door in a position with its outer vertical edge in close proximity to said wall structure, said latch being adaptable for release of said door upon actuation thereof from either side of said wall structure, said latch comprising:

an inside mounting and an outside mounting adapted to be inserted in an opening in said wall structure, said mountings being connected together to retain them in said opening,

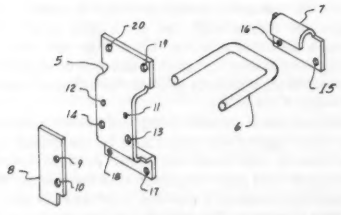
a latch member pivotally mounted on said outside mounting,

a remote release plate mounted on said inside mounting, and

a link interconnecting said plate and said latch member for interaction therebetween,

said latch member being mounted at a point intermediate the ends of said latch member, that portion of said latch member extending from said point in one direction forming a latch arm with the outer end thereof terminating in a door edge engaging latch element, and that portion of said latch member extending from said point in the other direction forming a link arm with its end connected to said link.

3,888,527
GATE LATCH
Melvin Roger Haisler, Rt. 5, Box 75, Denton, Tex. 76201
Filed Nov. 5, 1973, Ser. No. 412,981
Int. Cl.[2] E05C *3/04*
U.S. Cl. 292—213 **3 Claims**



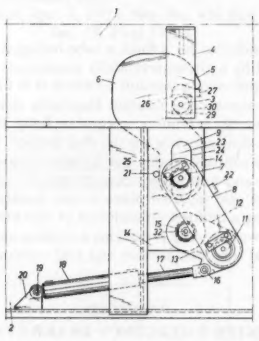
1. A pivoting fork gate latch containing a safety catch which automatically locks the fork in a horizontal position and firmly holds it in a vertical position, comprising:

a fork being a U-shaped rod resting on the top side of the lower of two angle-shaped flanges on a frame and held in place by a retainer, said retainer being a flat strap and having a portion shaped to fit over the axial section of said fork, said portion being notched on each side allowing it to fit between the legs of said fork;

said frame being formed of a strap to have an angle flange at top and bottom end and being slotted out on each side within the central portion allowing the fork to be engaged in this area, said slots beginning at inner end of a horizontal flange on lower end of said frame and extending into and through the horizontal portion of the said flange at top end of frame wherein said fork is supported in a horizontal position by the material remaining at the end of the two slots on the horizontal flange at bottom end of said frame and said fork is free to pivot upward to a vertical position;

a safety catch comprising, a flat strap of metal having a notched-out bottom corner on one side and a hole near the same side, said hole being a greater distance from the bottom end than the top end of said safety catch; when suspended in said hole with means connected to said frame in a corresponding location and facilitating proper relation between said notch and one leg of fork, said safety catch will automatically remain in a position that implements an obstruction which interferes with the pivoting movement of said fork; said safety catch must be manually forced into a position so that the notched edge coincides with the appropriate slotted edge of said frame in order to allow unrestrained pivoting movement of said fork.

3,888,528
HATCH BATTENING DEVICE
Boris Jericijo, Hisings Backa, Sweden, assignor to von Tell Trading Co. AB, Sweden
Filed May 3, 1973, Ser. No. 356,821
Claims priority, application Sweden, May 8, 1972, 6016/72
Int. Cl. B63b *19/14*
U.S. Cl. 292—256.5 **3 Claims**



1. An improved hatch battening device particularly intended for cargo hatches on board ships, said hatch battening device comprising a pin fixed relative to said hatch, a hook member associated with a coaming carrying said hatch, said hook member having a hook portion at one end thereof adapted to engage over said pin, means for operating said hook member between a latched position and a released position comprising a source of power, an arm supported for pivotal movement about a fixed pivot point on the coaming, means operatively connecting said source of power and said arm for pivoting said arm upon operation of said source of power, a link, means pivotally connecting said link to said arm, means providing a pivotal connection between said link

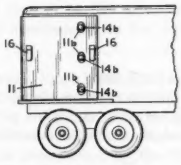
and said hook member, means providing a guide for said last mentioned pivotal connection for constraining the movement of said last pivotal connection in a vertical direction intersecting said pin, and means independent of said guide providing a fulcrum about which said hook member may pivot for guiding said hook member during the battening operation to effect movement of said hookshaped portion of said hook member first in a pivotal direction relative to the last pivotal connection and into contact with the pin and finally guiding said hook member in a vertical direction for guiding the final tightening movement of said hook member in a vertical direction to preclude pivotal movement of said hook member relative to said pin.

3,888,529

REAR DOOR LOCK FOR TRUCKS AND TRAILERS

Frank A. Mauritz, P.O. Box 9133, Fort Lauderdale, Fla. 33310

Filed Mar. 11, 1974, Ser. No. 450,091
Int. Cl.[2] E05C *19/18*
U.S. Cl. 292—259 **7 Claims**



1. A rear door lock for a cargo-carrying vehicle, such as a trailer or truck, which has a rear door and opposite sides with protrusions located forward from said rear door, said door lock comprising: a generally U-shaped body of spring steel shaped and dimensioned to snugly straddle the rear end of the vehicle and presenting a back wall to extent immediately behind the rear door on the vehicle and generally parallel opposite legs projecting forward from the opposite ends of said back wall to extend closely along the opposite sides of the vehicle in front of the rear door, said body having a vertical extent of substantially the full height of the rear door on the vehicle, said legs of said body having openings therein toward their front ends for snugly receiving said protrusions on the sides of the vehicle when said back wall of said body extends immediately behind said rear door on the vehicle, whereby to releasably lock said body to the sides of the vehicle, and brackets on the outside of said opposite legs of the generally U-shaped body, said brackets having respective depending segments which are offset laterally outward from said legs so as to receive slidably between them the lift arms of a fork lift truck which are spreadably apart substantially to pull said legs apart and thereby disengage said openings from said protrusions.

3,888,530

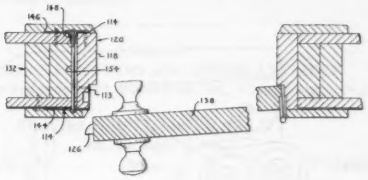
BOLT GUARDS FOR DOOR

Edward Fabrici, 7000 Carolina Pl., Merrillville, Ind.

Continuation-in-part of Ser. No. 252,836, May 12, 1972, abandoned. This application Apr. 16, 1973, Ser. No. 351,494
Int. Cl. E05c *19/00*
U.S. Cl. 292—340 **8 Claims**

1. Guard means to which a door may be securely locked to a frame member wherein said frame member is connected in spaced relation to a structural member forming a door opening in a wall, comprising:

a sheet plate member overlapping said frame member and said structural member; a second sheet plate member formed in a generally L-shape having a strike plate and side plate, said strike plate overlapping said frame member and said plate of said second sheet plate member overlapping the other side of said structural member; and a rigid member between said frame member and said



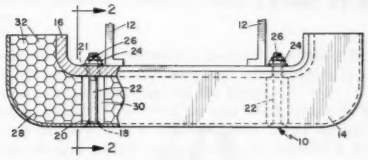
structural member secured at each end thereof to said sheet plate member and side plate of said second sheet plate member.

3,888,531

FRANGIBLE SHOCK ABSORBING BUMPER

George T. Straza, and Edward L. Parr, both of El Cajon, Calif., assignors to Straza Enterprises Ltd., El Cajon, Calif.

Continuation-in-part of Ser. No. 343,189, March 21, 1973, abandoned. This application Jan. 23, 1974, Ser. No. 424,442
Int. Cl. B60r *19/04;* **B61f** *19/04;* **F16d** *63/00*
U.S. Cl. 293—1 **10 Claims**



1. A shock absorbing bumper, comprising:

a forward impact bumper having upper and lower side plates forming a U-shaped cross section,

a back plate for attachment to a vehicle in a plane parallel to said forward bumper,

metal honeycomb material having a plurality of cells, with each cell extending through the entire thickness of said material in a direction substantially normal to said plane, said side plates abutting the upper and lower surfaces of said honeycomb material,

said cells of said honeycomb material having wax like material therein,

and means for securing said forward bumper to said back plate, sandwiching said honeycomb material between the forward bumper and back plate.

3,888,532

FENDER GUARD

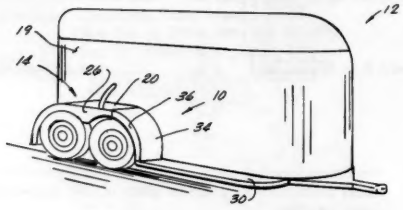
Timothy H. Link, RR 2, Toronto, Kans. 66777

Filed Jan. 2, 1974, Ser. No. 429,522
Int. Cl. B60r *19/02*
U.S. Cl. 293—62 **3 Claims**

1. In a vehicle fender having an inner side portion secured to a vehicle, an outer sidewall portion and a forward wall portion merging into said outer sidewall portion, said outer sidewall portion having a wheel opening therein, the improvement of a guard for said fender in combination therewith, comprising:

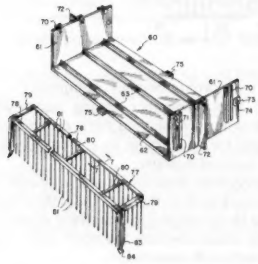
a. a relatively thin, bendable, impervious hard surfaced member mounted on the forward portion of said fender and having a shaped edge portion overlying said fender's outer sidewall portion from said wheel opening to said forward wall portion and an integral forward portion to

substantially completely cover said fender's forward wall portion, and



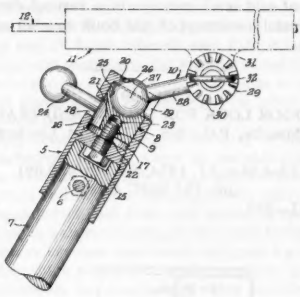
b. said member being secured flush against the exterior surface of said fender.

3,888,533
BULK TOBACCO RACK
William R. Long, Rocky Mountain Hwy., Tarboro, N.C. 27886
Division of Ser. No. 337,622, March 2, 1973, Pat. No. 3,834,137. This application May 17, 1974, Ser. No. 471,113
Int. Cl. A24b *1/08*
U.S. Cl. 294—5.5 **7 Claims**



1. Container means for receiving tobacco leaves comprising a rack means for receiving tobacco leaves in a random haphazard manner with the stems of the leaves disposed in a plurality of different directions, said rack means including an elongated side member, an end member fixed to each end of said side member and extending outwardly substantially normal thereto, said side member having a predetermined length and a width substantially wider than the length of the tobacco leaves, a plurality of independent pin frames, each pin frame having a length substantially equal to the length of said side member, means for selectively mounting each of said pin frames on said end members in spaced relationship to each other, each of said pin frames having a plurality of tines of a length to extend through the tobacco leaves which are located on said rack means, and means on said side member for supporting at least some of said tines, whereby after the tobacco leaves have been placed on said side member, a plurality of pin frames are selectively mounted on said end members so that the tines penetrate the leaves and thereafter the rack means can be rotated to an upright position so that the tines support all of the leaves in an uninterrupted column.

3,888,534
LINEMAN'S TOOL-HOLDING FIXTURE
Barnes R. Hall, 4882 Hartwick St., Los Angeles, Calif. 90041, and Ralph W. Hanna, 4724 Barnard St., Simi Valley, both of Calif. 93065
Filed July 9, 1973, Ser. No. 377,768
Int. Cl. A47f *13/06*
U.S. Cl. 294—19 R **2 Claims**



1. A lineman's fixture for holding a tool in operative engagement for carrying out operations on an electrically conducting wire or cable spanning between power line poles, said fixture being affixed to the end of an elongated handle and comprising:

a body secured to an end of said handle and having a cylindrical cavity beyond the end thereof,

a connector member disposed within said cavity and threadedly connected to said body to move both longitudinally and rotationally, said member being provided with a laterally directed handle that extends through an opening in said body and which, when moved in a plane transverse to length of the handle, effects the mentioned movement of the connector member,

said connector member and the outer end of the body being formed to provided a substantially hemispherical seat, and

a head member provided at one end with a ball that is fitted in said seat, is adjustably rotational therein when the connector member is moved rotationally to separate the head and body portions of the hemi-spherical cavity, thereby permitting universal adjustability of the head member in relation to the body, and is clamped against such universal movement when the connector member is moved to cause the same to move in the opposite direction and thereby effect clamping of said ball in fixed adjusted position relative to the mentioned body,

said head member having an arm portion extending from said ball, with a tool-connecting end that has fixed-incremental adjustable engagement with a wire- or cable-engaging tool.

3,888,535
FIREMAN'S PIKE POLE OR THE LIKE
Charles Rosso, Cimarron, N. Mex. 87714
Filed June 21, 1974, Ser. No. 481,706
Int. Cl. B25f *1/00*
U.S. Cl. 294—19 R **5 Claims**

1. A metal head for a fireman's pike pole, or the like comprising:

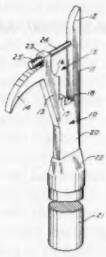
a shank for attachment to a pole;

a substantially flat body portion rigidly mounted on said shank;

said body portion having a generally triangular outline and comprising an elongated pointed portion extending in alignment with said shank and a lateral portion having a

laterally extending hook thereon, and located inwardly from the end of the pointed portion;

said body portion having a recess between said pointed portion and said lateral portion and opening toward the end of said pointed portion; and,



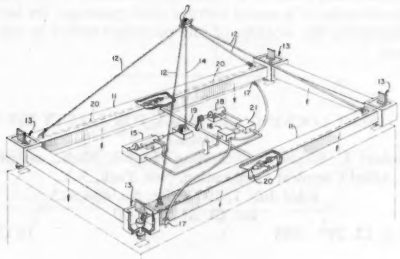
a retractable locking element mounted on said lateral portion and extending across the open end of said recess to close said recess whereby an object may be held in said recess and manipulated by the pike pole.

3,888,536

AUTOMATIC — SELF CONTAINED — LIGHT WEIGHT SPREADER BAR

Peter Durenec, Annandale, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 29, 1974, Ser. No. 437,566
Int. Cl. B66c *1/66*
U.S. Cl. 294—82 SF **4 Claims**



1. In a cargo container handling system, a spreader bar assembly including:

a moveable support;

a rectangular frame with corner attachments connected to said support;

a hydraulic power source assembly embodying a hydraulic piston means adapted such that selected movement of said piston means readies said hydraulic power source assembly for operation;

hydraulic control means for locking and unlocking the corner attachments of the spreader frame, said hydraulic control means including safety interlock means disposed at each point of attachment and responsive to the relative position of said spreader frame with respect to a cargo container, said control means adapted to lock and unlock corner attachments substantially simultaneously when a selected relative positioning of said spreader frame with respect to a cargo container occurs and the spreader frame concurrently fully rests on the cargo container; and

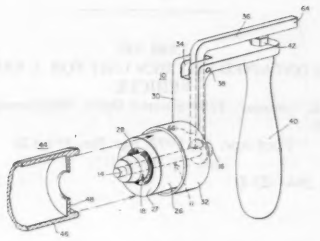
means connecting said hydraulic piston means of said hydraulic power source assembly to said moveable support such that a lift motion of said moveable support, with said spreader frame resting on the cargo container and undisturbed by said lift motion, pressurizes said hydraulic power source assembly.

3,888,537

CARRIERS FOR PIRNS AND OTHER ARTICLES

Gerard L. Lafond, 2811 Hunterdon Dr., Cinnaminson, N.J. 08077

Filed Oct. 5, 1973, Ser. No. 404,372
Int. Cl. B66c *1/54*
U.S. Cl. 294—93 **7 Claims**



1. A carrier designed to securely engage a flanged member comprising:

a shaft;

a flexible washer-type member, a portion of which is fixed securely relative to said shaft and which when in the secured position abuts against the flange;

a member slideably mounted on said shaft which in the secured position has a portion which abuts against a portion of said washer-type member to prevent it from flexing thus securing the flange; and

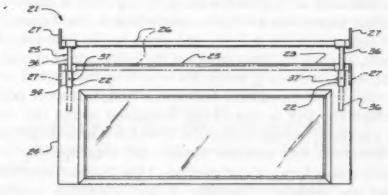
means communicating with said shaft to separate said slideable member from the portion of said washer-type member to which it abuts in the secured position thereby allowing said washer-like member to be flexed and the flange disengaged.

3,888,538

VEHICLE UTILITY RACK

John T. McWilliams, 2726 Kelly St., Livermore, Calif. 94550

Filed May 25, 1973, Ser. No. 364,019
Int. Cl. B60p *3/40*
U.S. Cl. 296—3 **12 Claims**



1. In a utility rack for mounting on a vehicle including mounting means formed for mounting said rack to said vehicle proximate a top surface thereof and load supporting means formed with a horizontally extending loading portion for support of a load thereon and an upstanding ear portion extending above said loading portion for retention of said load against lateral movement, said load supporting means being mounted to said mounting means for vertical movement of said loading portion, the improvement comprising:

said mounting means being formed for mounting to an end wall of said vehicle proximate said top surface, and said mounting means and said load supporting means being formed for selective securement of said loading portion in a load supporting position disposed above said top surface and in a stored position between about the level of said top surface and below said top surface; and

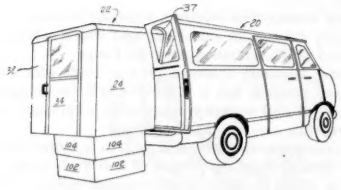
said ear portion being movably mounted with respect to said loading portion and formed for selective securement in a load retaining position extending above said loading portion and in a moved position between about the level of said top surface and below said top surface when said loading portion is in said stored position for compact storage of said utility rack with said top surface of said vehicle being substantially unobstructed.

3,888,539

SELF-CONTAINED KITCHEN UNIT FOR A VAN TYPE VEHICLE

Robert A. Niessner, 2280 Summit Drive, Hillsborough, Calif. 94010

Filed Apr. 16, 1973, Ser. No. 351,520
Int. Cl. B60p *3/32*
U.S. Cl. 296—23 D **25 Claims**



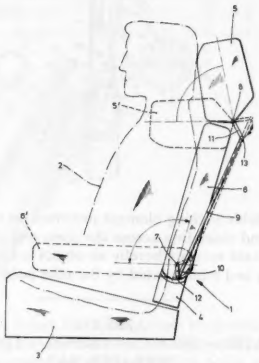
1. A self-contained kitchen unit for insertion through the rear opening of a vehicle having a body providing an enclosed space behind the driver and rear doors providing a rear opening in the body which is substantially the full interior height and width of the vehicle body, said kitchen unit comprising, two sidewalls, a rear end wall, a ceiling, and a floor joined together to provide a kitchen unit which is itself completely enclosed except for a front end open to the interior of the vehicle, kitchen facilities adjacent the inner side of at least one of the walls, mounting means for mounting the kitchen unit in the vehicle for movement between a first, transport position in which the unit is completely contained within the vehicle and a second, operative position in which a substantial part of the enclosed unit extends outside the rear opening of the vehicle with a forward end portion of the kitchen unit retained within the vehicle to provide, in said operative position, a kitchen space behind the vehicle which is enclosed by the kitchen unit in combination with the vehicle body, said floor having a drop down part, and floor lowering means for lowering the drop down part of the floor to ground level in the second, operative position to provide stand up space in that part of the kitchen unit, and wherein the drop down part of the floor is so located with respect to said kitchen facilities as to provide access to the kitchen facilities in a working relation when the drop down part of the floor is lowered to provide such stand up space.

3,888,540

SAFETY DEVICE

Dieter Protze, and Andreas Bauer, both of Fallersleben, Germany, assignors to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed Oct. 17, 1973, Ser. No. 407,100
Claims priority, application Germany, Oct. 31, 1972, 2253265
Int. Cl. A62b *35/00*; **A47c** *7/36*
U.S. Cl. 297—384 **10 Claims**



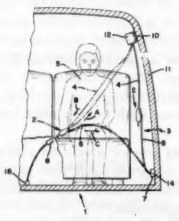
1. A safety device for an automotive vehicle having first and second passenger seats disposed along side each other, said second seat being provided with a head support extending above its back rest, said safety device comprising moving means for moving said head support from its head restraining position into a second position approximately at the height of the shoulder of a seated average adult passenger for laterally restraining the shoulder of said passenger seated in said first seat.

3,888,541

BELT LOCKING ASSEMBLY FOR SAFETY BELT BUCKLE

Robert L. Stephenson, Sterling Heights, Mich., assignor to Allied Chemical Corporation, New York, N.Y.

Filed July 1, 1974, Ser. No. 484,823
Int. Cl. A62b *35/00*
U.S. Cl. 297—388 **18 Claims**



1. A belt locking assembly for a vehicle safety belt adapted to be engaged by a buckle, said vehicle safety belt including a continuous length which forms a shoulder belt and a lap belt, said shoulder belt having a shoulder belt anchorage point and said lap belt having a lap belt anchorage point, said belt locking assembly being adapted to be mounted on the safety belt and adapted to slide upon a portion of the safety belt to adjust the length of the lap belt and shoulder belt, said belt locking assembly comprising:

a housing for said assembly;

a buckle engaging means extending from said housing and adapted to be engaged in said buckle;

a roller means supported by said housing and adapted to allow a portion of said safety belt to move upon said roller means to facilitate movement of said assembly with reference to said safety belt;

a lock bar mounted in said housing and having an unlocked position and a locked position, said lock bar adapted to be moved from said unlocked position to said locked position when said assembly is engaged in said buckle, said lock bar in said unlocked position allowing said assembly to slide with reference to said safety belt both in the direction of said shoulder belt anchorage point and in the direction of said lap belt anchorage point, said lock bar in said locked position preventing said assembly from sliding with reference to said safety belt in the direction of said shoulder belt anchorage point, but allowing said assembly to slide with reference to said safety belt in the direction if said lap belt anchorage point; and

biasing means mounted in said housing to bias said lock bar in said unlocked position.

3,888,542

ROAD PLANING MACHINES

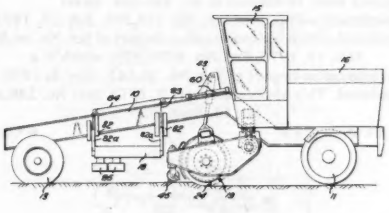
John Edward Gowler, Redhill, England, assignor to Non-Impact Surfaces Limited, Redhill, Surrey, England

Filed Dec. 14, 1973, Ser. No. 424,723

Claims priority, application United Kingdom, Dec. 22, 1972, 59513/72

Int. Cl. E21c *47/00*

U.S. Cl. 299—1 **10 Claims**



1. Apparatus for machining road surfaces of the kind comprising a body having road wheels and carrying a cutting drum mounted for rotation about an axis extending transversely of the direction of travel and movable into contact with a road surface to cut away a layer of the surface in which there is a first hydrostatic pump, connected to a hydrostatic motor for driving the drum in which there is a second hydrostatic pump connected to a hydrostatic motor for driving at least one of the road wheels and in which there is means to drive both of the pumps at constant speed, and both of the pumps have infinitely variable displacements, means being provided for varying the displacements of the pumps individually whereby any combination of drum and road wheel speeds may be provided, and valve means for connecting the pumps to the motors in a road machining position wherein the first pump is connected to the drum motor and the second pump is connected to the road wheel motor and a transit position wherein the first pump is connected to the road wheels.

3,888,543

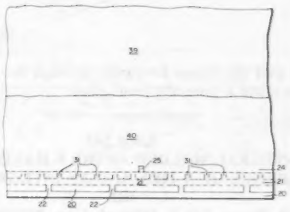
METHOD FOR MINING OIL SHALES, TAR SANDS, AND OTHER MINERALS

Robert W. Johns, 349 Ashley Crescent S.E., Calgary, Alberta, Canada

Filed Sept. 3, 1974, Ser. No. 502,296

Int. Cl.² E21C *41/10*

U.S. Cl. 299—11 **9 Claims**



1. In the mining of subsurface friable mineral ore deposits, a mining system including a mine having at least two operating levels, interconnected by shaft means, and spaced one from the other in the vertical direction, said system comprising:

a. a first operating level, positioned substantially at the base of said deposit, and having a tunnel complex adapted for the utilization of the Fixed Arch Shield mining technique, which tunnel complex includes:

i. a plurality of service tunnels bounding a designated mining area;

ii. a main access tunnel centrally bisecting said mining area, and;

iii. a plurality of transverse tunnels equidistantly spaced in parallel array, and extending from said main access tunnel to adjacent of said service tunnels, to provide communication therebetween, and to define a multiplicity of mining blocks, said level further including conveyor means adapted to collect and transport said mined ore to said shaft means;

b. means for mining said deposit, and;

c. a second operating level positioned below said first level and parallel therewith, said second level having a tunnel complex linked with said shaft means; said level further including means operatively associated with said shaft means, adapted to receive ore passing from said first level through said shaft means and to transport said ore from said mine.

3,888,544

SYSTEM FOR CHIPPING AND MOVING ICE

John D. Bennett, Denton, Tex., assignor to Sun Oil Company, Dallas, Tex.

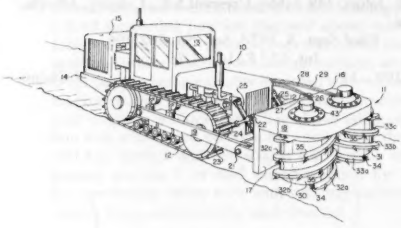
Filed Dec. 3, 1973, Ser. No. 420,815

Int. Cl. E01h *5/12*

U.S. Cl. 299—25 **11 Claims**

1. A system for chipping ice and forming a pathway through rough, icy terrain, comprising: a pair of cylindrical drums mounted for rotation about parallel vertical axes, each of said drums including a smooth, outwardly rounded lower end surface to support the weight of the drum; a plurality of spikes protruding outwardly from the cylindrical outside surface of each drum to engage and chip the ice, the circular paths formed by the tops of the spikes when the drums are rotated

being overlapping in the regioon between the drums; and means for rotating said drums in opposite directions to chip



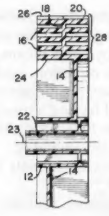
ice and pull the drums forwardly through the ice to form a pathway along a generally level grade.

3,888,545

INTEGRAL MOLDED ARTICLE HAVING THE APPEARANCE OF A TIRE AND AN INTEGRAL WHEEL-IRE

Arthur R. Braun, 209 E. Mildred, Cary, Ill. 60013

Filed Oct. 23, 1973, Ser. No. 408,516
Int. Cl. B60b *5/02*
U.S. Cl. 301—63 PW **11 Claims**



1. An integral tire and wheel combination having the general appearance and functional capability of a tire, comprising: a central hub portion, a thin radially extending annular support disc, a plurality of concentric spaced-apart fins axially extending from at least one face of said disc and being integral therewith, and means including a support member extending radially between said hub portion and said support disc for supporting said disc in spaced relation to said hub portion.

3,888,546

PROPORTIONING VALVE SYSTEM FOR REAR BRAKING CIRCUIT

Calmer M. Stordahl, Jr., Metamora, Mich., assignor to General Motors Corporation, Detroit, Mich.

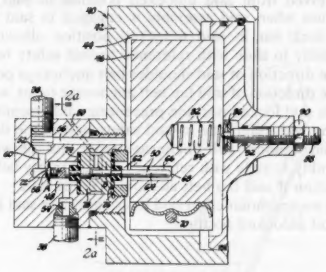
Filed Nov. 14, 1973, Ser. No. 415,566
Int. Cl. B60t *8/14*
U.S. Cl. 303—6 C **1 Claim**

1. A vehicle brake pressure control valve and valve control mechanism comprising:

a housing having a fluid pressure inlet and a fluid pressure outlet and a valve chamber having an intermediate chamber section connected with said outlet and having opposite ends connected with said inlet, one of said chamber ends being formed about one inlet connection to provide a valve seat;

a valve assembly reciprocably received in said valve chamber and engageable with said valve seat at said one inlet connection to open and close said one inlet connection when reciprocably moved and having a first area exposed to inlet pressure at said one inlet connection, a second area opposed to and smaller than said first area and maintaining the other chamber inlet connection closed and exposed to inlet pressure, said chamber intermediate section and said outlet being fluid connected with said inlet through said one inlet connection when said valve is positioned to open said one inlet connection;

a vehicle deceleration sensing member positioned to act on said valve assembly against the force differential generated by said unbalanced valve areas and fluid pressure at



said inlet acting thereon to overcome that force differential and move said valve to close said one inlet connection when the relationship between vehicle deceleration and the inlet pressure exceeds a predetermined ratio;

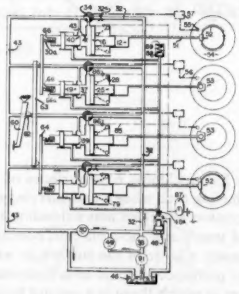
and adjustable biasing means acting on said deceleration sensing member in one direction and adjustable to change the predetermined ratio between vehicle deceleration and inlet pressure.

3,888,547

COMBINED POWER BRAKE AND ANTISKID ACTUATORS

Benjamin Ron, 10 Sanhedrin St., Tel-Aviv, Israel

Continuation-in-part of Ser. No. 166,399, July 27, 1971, abandoned, which is a continuation-in-part of Ser. No. 80,899, Oct. 15, 1970, Pat. No. 3,751,919, which is a continuation-in-part of Ser. No. 34,143, May 4, 1970, abandoned. This application Apr. 3, 1972, Ser. No. 240,455
Int. Cl. B60t *8/06*
U.S. Cl. 303—21 F **6 Claims**



1. A combined Power Brake and Antiskid Actuators comprising in combination;

a. a brake pedal for accepting an operator's force and work inputs,

b. a plurality of brake control valves each comprising,

1. a housing defining a first and a second bore,

2. a power piston slideable in said first bore,

3. a reaction piston slideable in said second bore, being normally spaced from said power piston, and adapted

to establish a mechanical abutment with said power piston after a certain relative movement therein between occurred,

4. a passage for servo fluid flow leading through a variable volume defined between the power piston the reaction piston and the housing, and continuing through a variable restriction point defined between said reaction piston edge and a lip of a peripheral groove formed around said second bore,

c. a mechanical differential linkage for distributing said force and work inputs between said reaction pistons,

d. a control unit for sensing a skid condition and relaying a command to at least one of said brake control valves.

e. a first control means for blocking said servo fluid flow from entering said variable volume of at least one of said brake control valves, in response to said command from a control unit

f. a second control means for blocking said reaction piston from mechanically abutting against said power piston in response to the existence of a pressure in said servo fluid wherein, in response to said command from said control unit said first control means block the entrance of said servo fluid flow into said variable volume and open a passage between said variable volume and a return line for bypassing said restriction point and venting said variable volume.

3,888,548

ANTI-LOCK VEHICLE BRAKE SYSTEM

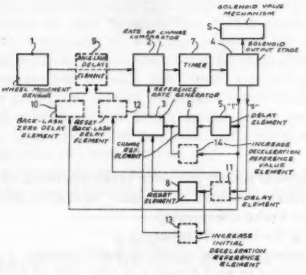
Denis Sharp, Salford, near Redhill, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed July 18, 1972, Ser. No. 272,776

Claims priority, application United Kingdom, July 27, 1971, 35321/71

Int. Cl. B60k *8/12*

U.S. Cl. 303—21 CG **12 Claims**



1. An electronic control system for an anti-lock vehicle brake system containing at least one brake, said control system being responsive to an input signal from a wheel movement sensor associated with a wheel of said vehicle system, which measures change in wheel speed, said signal varying in accordance with the rate of said speed change, said electronic control system comprising:

a solenoid valve mechanism connected to a brake of said anti-lock system for reducing brake pressure of said brake when braking takes place and wheel deceleration exceeds a reference value;

a control circuit connected to said wheel movement sensor and to said solenoid valve mechanism and having a reference control circuit therein, said reference control circuit being responsive on energisation of said solenoid valve mechanism by said control circuit for progressively varying said reference value in a positive sense at a predetermined rate, said solenoid valve mechanism being held energized by said control circuit until the rate of change of said wheel speed bears a given relationship to said varying reference value.

3,888,549

DEVICES FOR CONTROLLING THE BRAKING OF VEHICLE WHEELS

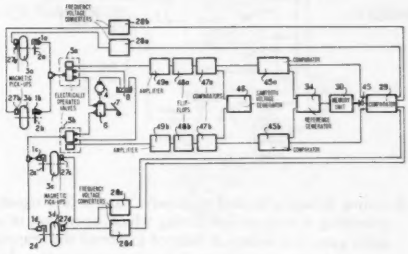
Albert Grosseau, Chaville, France, assignor to S.A. Automobiles Citroen, Paris, France

Filed Jan. 31, 1973, Ser. No. 328,304

Claims priority, application France, Feb. 8, 1972, 72.04583

Int. Cl. B60t *8/08*

U.S. Cl. 303—21 EB **20 Claims**



11. Apparatus for controlling the braking of front and rear wheels of a vehicle, which comprises:

a. first means operative to generate a first signal representing the speed of the fastest of said front and rear wheels, a second signal representing the speed of the slowest of said front wheels, and a third signal representing the speed of the slowest of said rear wheels;

b. second means operative to receive said first signal and generate a reference signal proportional thereto and representing a reference speed;

c. third means operative to receive said second, third, and reference signals and generate first and second pulsed current control signals; and

d. first and second electrically-operated valves operative to receive said first and second pulsed current control signals, respectively, and in response thereto automatically proportion braking pressure to said front wheels and rear wheels, respectively; and

e. said second means further comprises multiplier means operative to receive said first signal, generate said reference signal therefrom at a fraction of said first signal and automatically select one of a plurality of multiplier fractions according to the value of said first signal.

3,888,550

ANTI-WHEEL SKID CONTROL SYSTEM PROVIDING CONTROLLED REAPPLICATION OF BRAKE PRESSURE

Erich Reinecke, Beihorn, Burg; Fritz Isernhagen, Letter; Alfred Klatt, Ronnenberg; Lutz Weise, Misburg; Wilhelm Schlamann, Altwarmbuchen, and Klaus Lindemann, Hannover, all of Germany, assignors to Westinghouse Bremsen-und Apparatebau GmbH, Hannover, Germany

Filed Oct. 10, 1973, Ser. No. 404,849

Claims priority, application Germany, Feb. 5, 1973, 2305589; Feb. 15, 1973, 2307368

Int. Cl. B60t *8/12*

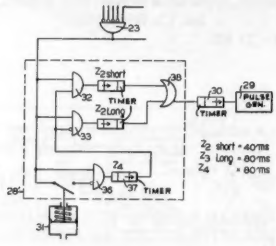
U.S. Cl. 303—21 P **4 Claims**

1. For use in a vehicle having an anti-skid brake control system of the fluid pressure type employing signaling means for monitoring and evaluating the behavior of a wheel of said vehicle, and an electronic logic control device responsive to the signaling means, said electronic logic control device comprising:

a. control valve means for modulating fluid brake pressure delivered to a corresponding wheel of said vehicle;

b. control circuit means for operating said control valve means responsive to a first signal emitted by said signaling means when recovery of a skidding wheel is sensed following correction thereof so as to effect the reapplication of fluid brake pressure thereto;

c. pulse generator means for periodically interrupting said reapplication of fluid brake pressure; and



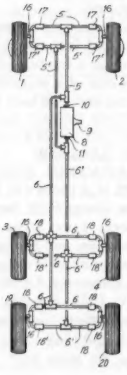
d. timing means activated responsive to said first signal for providing a time period during which operation of said pulse generator means is delayed to permit the reapplication of brake pressure to follow a reapplication brake pressure build-up curve having a predetermined brake pressure versus time characteristic such that during said time period, a greater degree of brake pressure reapplication occurs when the brake pressure is reapplied from a higher existing brake pressure than from a lower existing brake pressure.

3,888,551

APPARATUS FOR CONTROLLING THE ACTUATION OF THE BRAKES OF A MOTOR VEHICLE

Antonio Maria Castello Brancoe Neves, Dominguisa, Tortasendo, Covilha, Portugal

Continuation of Ser. No. 138,658, April 29, 1971, abandoned. This application Oct. 29, 1973, Ser. No. 410,365
Claims priority, application Portugal, Apr. 30, 1970, 53698
Int. Cl. B60t *17/18*
U.S. Cl. 303—84 A **1 Claim**



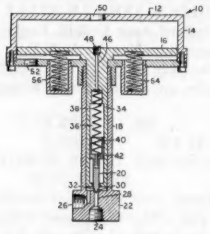
1. Brake apparatus for hydraulic or pneumatic brakes of a motor vehicle having at least two wheels, said apparatus comprising two independent branch circuits each connected to all the wheels of the vehicle for operating the brakes thereof, and means connecting said circuits to said wheels in parallel with one another, said means comprising a T-shaped connector at each wheel having one arm connected to the brake actuator of such wheel and second and third arms connected to respective of said circuits, means including a single master cylinder feeding both said circuits separately with pressure fluid comprising a distribution valve having an inlet for pressure fluid and two outlets, each outlet being connected to a respective circuit, and a check valve in each circuit adjacent each T-shaped connector such that each of the second and third arms of each T-shaped connector is fed from the master cylinder via a respective one of said check valves, each check valve being constructed to close upon sudden pressure drop in the associated circuit to prevent flow of pressure fluid to such circuit from the other circuit and to remain closed after such closure thereof.

3,888,552

AUXILIARY OPERATING APPARATUS FOR VEHICLE SERVICE BRAKE

John G. Fontaine, Fort Lauderdale, Fla., assignor to Fail Safe Brake Corporation, Fort Lauderdale, Fla.

Division of Ser. No. 346,686, March 30, 1973, Pat. No. 3,845,932. This application Mar. 20, 1974, Ser. No. 452,742
Int. Cl. B60t *17/16*
U.S. Cl. 303—84 R **8 Claims**



1. In a vehicle having a service brake operated by hydraulic fluid in a conduit means, an auxiliary operating apparatus for said service brake comprising:

a housing having a chamber,

a valve stem movable axially in said housing,

orifice means in said housing at one side of said chamber forming a valve seat in the path of said valve stem,

first and second passages in said housing at said one side of said chamber providing a path for hydraulic fluid flow through said orifice means,

piston means in said chamber for operating said valve stem,

conmector me[ns for connecting said valve stem to said piston means to move said valve stem axially in said housing for opening and closing said orifice means,

said connector means and said valve stem being interconnected so as to allow movement of said piston means and said connector means towards said valve seat after said valve stem engages said valve seat for pressurizing hydraulic fluid adjacent to said valve seat,

and means to allow a fluid pressure change in at least one portion of said chamber to actuate said piston means, and said first and second passages being connected in hydraulic circuit with said conduit means for applying said service brake as a result of the aforesaid pressurizing of hydraulic fluid adjacent to said valve seat and for releasing said service brake upon retraction of said piston means and connector means.

3,888,553
LEVITATED ROTARY MAGNETIC DEVICE

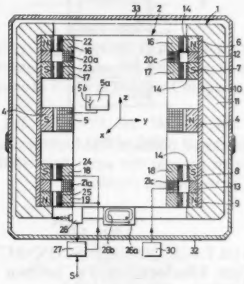
Heinz Wehde, Rothenberg, Germany, assignor to Teldix GmbH, Heidelberg, Germany

Continuation-in-part of Ser. No. 336,215, Feb. 27, 1973, Pat. No. 3,845,995. This application July 25, 1974, Ser. No. 491,957

Claims priority, application Germany, July 25, 1973, 2337696

Int. Cl. F16c *39/06*

U.S. Cl. 308—10 **21 Claims**



1. A magnetic device comprising, in combination:

a stator;

a rotor disposed for rotation relative to said stator;

a plurality of permanent magnets mounted on, and spaced around the circumference of, said rotor to be in the form of a ring with the magnets alternating in polarity around said rotor circumference in a manner such that the magnetic field lines extend substantially parallel to a surface of said rotor between said rotor and said stator in regions between adjacent magnets and extend substantially perpendicular to such rotor surface in the region of each magnet; a plurality of windings disposed on said stator and distributed around the circumference of said stator and intersected by said field lines; current generating means connected to said windings for providing currents in said windings which create forces acting on the rotor in the axial, radial and tangential directions, relative to the direction of rotor rotation; and

a plurality of annular magnetic rings mounted on said stator for producing magnetic forces which act on said rotor.

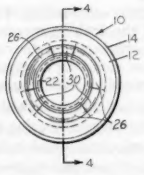
3,888,554
SELF LUBRICATING SPHERICAL BEARING ASSEMBLY

Albert R. McCloskey, Fairfield, Conn., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Filed Jan. 10, 1974, Ser. No. 432,145

Int. Cl. F16c *23/04, 27/02, 33/20*

U.S. Cl. 308—72 **8 Claims**



1. A spherical bearing assembly having an inner race member and an outer race member, the inner surface of the outer race member being a concave spherical surface, the outer surface of the inner member being a complimentary convex spherical surface, the inner member including a spool member having two annular lips at each end thereof and at least three axially segmented spherical segments interlocked by said annular lips in an axial direction on the spool member, a gap provided between at least two of said spherical segments, a self-lubricating segment interposed between said two segments in the area defined said gap.

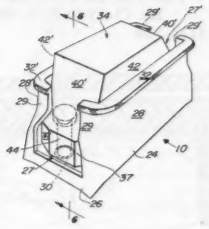
3,888,555
ELASTOMERIC RAILWAY CAR SIDE BEARING

John H. Van Moss, Jr., 3 Mayor Ln., Highland Park, Ill. 60035

Continuation-in-part of Ser. No. 283,044, Aug. 23, 1972, abandoned. This application Dec. 3, 1973, Ser. No. 421,405

Int. Cl. B61f *5/14;* **F16c** *17/10;* **F16f** *1/54*

U.S. Cl. 308—138 **5 Claims**



1. A side bearing for mounting on a truck bolster of a railway car bogie comprising:

a. a hollow structural housing having an open top, side, bottom and end walls, said end walls having straight vertical walls extending upwardly from said base and the upper ends of said walls arcuately tapered inwardly, and

b. an upright body member of hard elastomeric material having a top extending upwardly and outwardly of the housing and the major portion of the body member snugly fitting therein, said body member having a bottom wall and end walls extending upwardly in a vertical direction from the bottom wall and then tapered inwardly towards the top.

3,888,556
GLOVE BOXES AND SIMILAR CONTAINMENTS

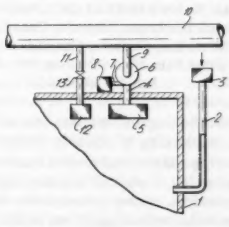
Robert Edmund Strong, Larbert; Kenneth Boyle, and John Grant, both of Warrington, all of England, assignors to British Nuclear Fuels Limited, Riseley Warrington Cheshire and United Kingdom Atomic Energy Authority, London, both of, England

Filed Nov. 30, 1973, Ser. No. 420,585

Claims priority, application United Kingdom, Dec. 11, 1972, 56987/72

Int. Cl. F15c *1/16*

U.S. Cl. 312—1 **4 Claims**



1. In a containment segregating a space from its surrounding atmosphere and provided with an extract system for the atmo-

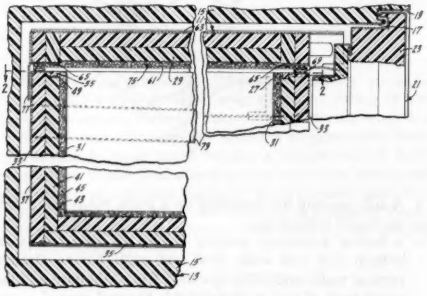
sphere of the containment the improvement of including in the system a vortex amplifier venting into the system at a point where the system pressure is lower than that of the containment when the extract system is operating, the vortex amplifier also having its main inlet in fluid flow connection with the containment and a control inlet in fluid flow connection with the atmosphere outside the containment arranged to provide a control flow to throttle fluid flow through the vortex amplifier main inlet.

3,888,557

INSULATED INNER CONTAINER FOR A FIRE RESISTANT FILE CABINET

Clarence A. F. Anderson, Fruitport, and Robert A. Laird, Muskegon, both of Mich., assignors to Shaw-Walker Company, Muskegon, Mich.

Filed Feb. 28, 1974, Ser. No. 446,592
Int. Cl. E04b *2/34;* **B65d** *25/18*
U.S. Cl. 312—214 **9 Claims**



1. An insulated inner container for a fire resistive filing cabinet, including:
- a lower portion having bottom, side and end walls and an open top,
- said walls of said lower portion formed of inner and outer sheets of metal which are spaced apart to form a hollow enclosure with said inner and outer sheets of metal cooperating to form the top surfaces of said side and end walls, insulating material installed in said hollow enclosure of said walls,
- a groove formed in said insulating material at the top surfaces of said side and end walls,
- said inner and outer sheets of metal having downturned edges extending into said groove on opposite sides of the groove, and
- a thermal barrier of heat resistant adhesive filling said groove, and
- a removable cover for closing said open top of said lower portion of said container.

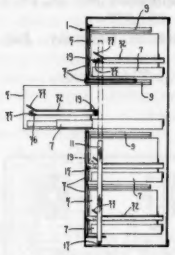
3,888,558

LOCK AND INTERLOCK MECHANISM

Ernst G. Himsl, Kitchener, Ontario, Canada, assignor to Sunar Limited, Waterloo, Ontario, Canada

Filed Feb. 19, 1974, Ser. No. 443,871
Int. Cl. E05b *65/46*
U.S. Cl. 312—216 **16 Claims**

1. A cabinet having top, bottom, rear and side walls and an open front, a plurality of slidable shelves arranged to slide from an inner position out the open front to an exposed position and a plurality of pivoted doors swingable between vertical closed positions closing access to the shelves and horizontal open positions permitting access to the shelves, each door associated with one shelf, a combined lock means for simultaneously preventing the doors from being moved from their closed positions and preventing sliding of said shelves from their inner positions, said lock means including a vertically movable lock bar movable between a locking and an unlocking position, lock device means on said lock bar and engaging said doors when said lock bar is in locking position and said



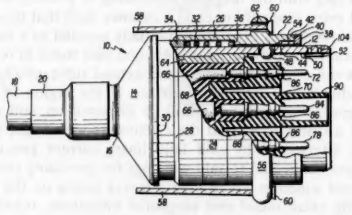
doors are in closed position said lock device means engaging said shelves to prevent the same from sliding out when the lock bar is in its locking position.

3,888,559

HIGH VOLTAGE QUICK DISCONNECT ASSEMBLY

R. Larry Geib, Elizabethtown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 243,723, April 13, 1972, abandoned.
This application Nov. 19, 1973, Ser. No. 417,436
Int. Cl. H01r *3/54*
U.S. Cl. 339—46 **11 Claims**



1. A high voltage quick disconnect assembly comprising:
- a plug assembly including a housing having an opening at one end thereof,
- movable lock operating means mounted around at least a portion of said housing and movable axially of said housing,
- actuating means coupled to said lock operating means for actuating said lock operating means,
- a plurality of movable locking members positioned in apertures in said housing, said housing including means for limiting movement of said locking members inwardly of said housing, said locking members being movable outwardly of said housing,
- a resilient biasing member surrounding the housing and located rearwardly of the locking members for biasing said lock operating means in a first direction,
- said lock operating means including a plurality of surfaces for engaging and selectively positioning said plurality of locking members in locked and unlocked position,
- indicating means mounted on said housing capable of providing a locked and unlocked visual indication and responsive to positioning of said locking members a predetermined distance outwardly from said point of limited inward movement thereof for providing said unlocked visual indication,
- a first plurality of electrical connectors positioned within said housing, and

insulating means mounted within said housing surrounding at least a portion of said first plurality of electrical connectors,

receptacle means for mating with said plug assembly including:

a protruding portion shaped to fit into said opening in said housing, said protruding portion defining a locking groove means for interfitting with said plurality of locking members,

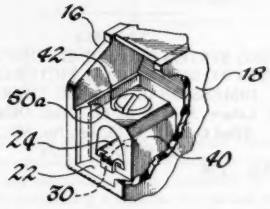
said receptacle means including a ring of spring fingers for resiliently engaging an outer surface of said housing of said plug assembly.

3,888,560

ELECTRICAL TERMINAL CONFIGURATION

James I. Smith, Bristol, and James E. McGann, Plainville, both of Conn., assignors to General Electric Company, New York, N.Y.

Filed Feb. 13, 1974, Ser. No. 441,961
Int. Cl. H01r *7/08*
U.S. Cl. 339—59 R **7 Claims**



1. An electrical termination comprising, in combination:

A. means forming a terminal recess, said recess bounded by an insulative backwall, opposed sidewalls and a bottom wall;

B. an elongated terminal strap of conductive metal spring stock extending through said backwall into said terminal recess, said strap having

1. turned down lateral edges,
2. a turned down frontal tab engaging said bottom wall to support said strap with said lateral edges in spaced relation to said bottom wall, and
3. means forming a tapped hole in said strap located inwardly from said tab; and

C. an electrical connector engaging said strap for clamping an electrical conductor thereto.

3,888,561

REAL TIME, LARGE VOLUME, MOVING SCENE HOLOGRAPHIC CAMERA SYSTEM

Robert L. Kurtz, Huntsville, Ala., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Aug. 10, 1973, Ser. No. 387,266The portion of the term of this patent subsequent to Aug. 7, 1990, has been disclaimed.
Int. Cl. G02b *27/00*
U.S. Cl. 350—3.5 **4 Claims**

1. An apparatus for producing holographic motion pictures of a scene, moving in a random direction within a volume, said moving scene having a velocity of motion represented by X, Y and Z velocity components, comprising:

a light source for producing a coherent beam of radiation;

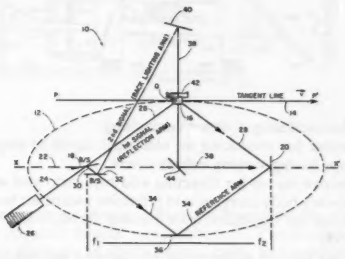
first beam splitter means positioned to receive said coherent beam and to split said coherent beam into two beams, a first signal beam which passes straight through said first beam splitter means and becomes incident upon said moving scene and a reference beam which is reflected;

second beam splitter means positioned to receive said reflected reference beam and to split a second signal beam from said reference beam, whereby said reference beam passes straight through said second beam splitter means and said second signal beam is reflected;

third beam splitter means positioned to receive said second signal beam and to split a third signal beam from said second signal beam, whereby said second signal beam passes straight through said third beam splitter means and said third signal beam is reflected;

a first light reflector means positioned to reflect said reference beam, after said reference beam passes through said second beam splitter means;

a second light reflector means positioned to reflect said second signal beam so that it becomes incident upon said



moving scene, after said second signal beam is split from said reference beam by said second beam splitter means;

a third light reflector means positioned to reflect said third signal beam so that it becomes incident upon said moving scene, after said third signal beam is split from said second signal beam by said third beam splitter means;

a motion picture camera back, said camera back having a film mounted on it, said film being positioned to receive said reference beam after reflection from said first light reflector means and said first, second and third signal beams after they are reflected from said moving scene, whereby said reference beam and said first, second and third signal beams all interfere with one another in the plane of said film;

said first beam splitter means being positioned at the first focus of a first ellipse, said second light reflector means being positioned at the first focus of a second ellipse, and said third light reflector means being positioned at the first focus of a third ellipse, the said three ellipses being interrelated by having their long axes perpendicular to each other and their second foci coinciding, said three ellipses being oriented so that said X velocity component of said moving scene is tangent to said first ellipse, said Y velocity component of said moving scene is tangent to said second ellipse, said Z velocity component of said moving scene is tangent to said third ellipse, and said long axes of said three ellipses are respectively parallel to said X, Y and Z velocity components, the plane of said film being positioned so as to pass through the said coinciding second foci of the said three ellipses, said moving scene being positioned on the mathematical circumference of each of said ellipses in the vicinity of the intersection of the circumference of each said ellipse with its own semi-minor axis, the size and shape of each of said three ellipses and the location of their said foci being determined by the formula $Vt = (\Delta L/2)^{1/2}\, a^{3/2}/b \qquad \Delta x$(or ΔY or ΔZ), where V is the velocity component; t is the time of exposure; L is the optical path length of said first signal beam and is equal to the ellipse constant, $2a$; ΔL is the maximum change in length L caused by the component of scene travel which is tolerable without causing blurring;

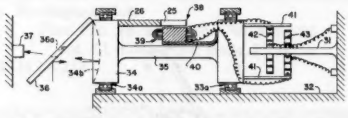
a is the semi-major axis; b is the semi-minor axis; d is the distance of separation between a focus and the origin of the ellipse; and a and b are related to the third ellipse parameter d by the formula $a^2 = b^2 + d^2$.

3,888,562

OSCILLATING SCANNER

Frank C. Rushing, Columbia, and Gordon S. Ley, Arnold, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 6, 1973, Ser. No. 330,163
Int. Cl. G02b *17/00*
U.S. Cl. 350—7 **12 Claims**



1. An oscillating scanner comprising:
a sensor for producing an electrical signal in response to rays having varying energy levels;
reflective means for directing said rays onto said sensor;
a primary body carrying said reflective means for movement about an oscillation axis passing through said primary body;
bearing support means rotatably carrying said primary body for oscillating motion of said reflective means and said primary body about said oscillation axis;
a reaction body having a moment of inertia bearing a predetermined proportional relation to the moment of inertia defined by the combination of said reflecting means and said primary body;
bearing support means rotatably carrying said reaction body for oscillating motion by said reaction body about said oscillation axis;
spring means interconnecting said primary body and said reaction body for supplying an elastic restoring force to produce sustained harmonic oscillations of said reflective means about said oscillation axis while said reaction body oscillates; and
driver means for generating a relative torque between said primary body and said reaction body in a manner to compensate for losses to said elastic restoring force to thereby maintain harmonic oscillations of said reflective means at a predetermined frequency and amplitude.

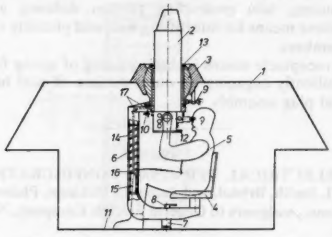
3,888,563

OBSERVATION AND MEASURING STAND FOR OPTRONIC DEVICES IN A VEHICLE

Hermann Dierkes, Vellmar, Germany, assignor to Rheinstahl Henschel Aktiengesellschaft, Kassel, Germany

Division of Ser. No. 159,127, July 2, 1971, Pat. No. 3,796,478. This application Dec. 4, 1973, Ser. No. 421,614
Claims priority, application Germany, July 7, 1970, 2033589; Aug. 13, 1970, 2040284; Aug. 21, 1970, 2041603; Aug. 25, 1970, 2042089
Int. Cl. G02b *21/24*
U.S. Cl. 350—85 **16 Claims**

1. A special cardanic suspension in combination with an armored vehicle, including a frame having a top wall and a floor: a periscope-like optical device movable for fine and coarse adjustment during observation and measurement occurring only out of a stationary vehicle, said device having three rotary degrees of freedom given thereto in a minimum of space and extending through said top wall having a laterally directed objective end above said top wall and a laterally directed viewing end beneath said top wall, first bearing means rotatable about a vertical axis and supporting said optical device, second bearing means swivelly supporting said first bearing means in said top wall, first adjustable means for rotating said optical device in said first bearing means and second adjustable means for adjusting the swivelled position of said optical device in said top wall, a bushing surrounding



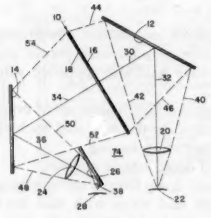
said optical device, said first bearing means being interposed between said bushing and said second bearing means, said bearing means including preloading means so as to be play free.

3,888,564

VIEWING SYSTEM PROVIDING COMPATABILITY BETWEEN TWO DIMENSIONAL PICTURES AND THREE DIMENSIONAL VIEWING THEREOF

Marvin E. Lebow, 3431 E. 62 Pl., Tulsa, Okla. 74136

Filed Oct. 11, 1973, Ser. No. 405,392
Int. Cl. G02b *27/24*
U.S. Cl. 350—138 **7 Claims**



1. A method of providing compatibility between two dimensional pictures and three dimensional viewing thereof which consists of providing a left eye image and a right eye image of an identical scene, reversing one of said images with respect to the other, maintaining a normal image for the other of said images, securing said reversed image in aligned back to back relationship with said normal image whereby said normal image may be viewed in a standard two dimensional manner, providing a first sighting path for viewing of the left eye image by the left eye of a beholder, providing a second sighting path for viewing of the right eye image by the right eye of the beholder simultaneously with the left eye viewing whereby said images may be viewed in a simulated three dimensional manner.

4. In combination, a picture having a pair of right eye and left eye matched images disposed in aligned back to back relationship with one of said images being normal image and the other of said images being reversed image, and a three dimensional viewing apparatus comprising picture receiving means for supporting the picture for simultaneous viewing of both images thereof, first eye piece means, first reflector means interposed between the first eye piece means and the picture receiving means for transmitting said one image to the first eye piece and converting said one image to a normal image at the first eye piece means, second eye piece means spaced from the first eye piece means, second reflector means

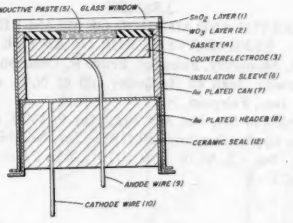
interposed between the second eye piece means and the picture receiving means for transmitting said other image to the second eye piece means and converting said other image to a normal image at the second eye piece whereby both images may be viewed simultaneously in simulated three dimensional viewing.

3,888,565

ELECTROCHROMIC VOLTAGE INDICATOR

Gottfried Christian Haacke, Stamford, and Donald John Tracey, Jr., Weston, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed Jan. 2, 1973, Ser. No. 320,413
Int. Cl. G02f 1/36
U.S. Cl. 350—160 **4 Claims**



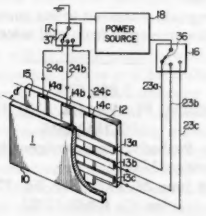
1. A device for fault detection in integrated circuitry comprising an electrochromic current flow indicator means, container means, and electrical circuit connector means, said container means comprising a metallic can sealed at one end with a glass window, and at the other end with a metallic cup, said indicator means being in said container means and comprising a layer of a persistent electrochromic material, a counterelectrode and an electrolyte therebetween, said electrical connector means being connected to said device so as to allow passage of an electrical current between said electrochromic layer and said counterelectrode.

3,888,566

ELECTRO-OPTICAL DEVICE INCLUDING AN IMPROVED LIQUID CRYSTAL COMPOSITION

Kazuhisa Toriyama; Fumio Nakano; Mikio Sato, all of Hitachi; Hidetoshi Abe, Katsuta, and Mikio Kanazaki, Mobara, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Aug. 10, 1973, Ser. No. 387,272
Claims priority, application Japan, Aug. 11, 1972, 47-79941
Int. Cl. G02f 1/16
U.S. Cl. 350—160 LC **28 Claims**



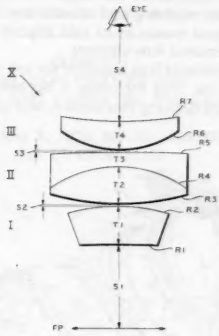
19. A composition comprising nematic liquid crystals and a sufficient amount of a halide salt of an organic quaternary nitrogen compound selected from the group consisting of pyridinium halide and acridinium halide to enhance the dynamic scattering motion of said nematic liquid crystals.

3,888,567

10X THREE ELEMENT EYEPIECE

Arthur H. Shoemaker, West Aurora, N.Y., assignor to American Optical Corporation, Southbridge, Mass.

Filed May 1, 1974, Ser. No. 465,934
Int. Cl. G02b 9/22
U.S. Cl. 350—229 **3 Claims**



1. A microscope eyepiece having a magnification of about 10X, an apparent field of view of about 52.3° and a maximum exit pupil diameter of about 1.6mm, being well corrected for coma, astigmatism, distortion and color and having a focal length F and three lens elements aligned along an optical axis extending from the focal plane of said eyepiece, which comprises a concavo-convex positive singlet I as the first element, a double convex positive doublet II as the second element and a convex-concavo positive singlet III as the third element to provide a Petzval radius of 1.42F and eye relief of 0.77F.

3,888,568

MULTI-ELEMENT LENS ASSEMBLY

Philip R. Norris, North Reading, and Leon Rubinstein, Natick, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed June 20, 1974, Ser. No. 481,126
Int. Cl. G02b 7/02
U.S. Cl. 350—252 **20 Claims**

1. A multi-element lens assembly comprising:

an uncentered lens element having a geometrical axis and an optical axis which is eccentric with respect to said geometrical axis such that diametrically opposed points along a periphery of said uncentered lens element, measured radially from said geometrical axis and said optical axis, are symmetrically disposed with respect to said geometrical axis but are not symmetrically disposed with respect to said optical axis;

a plastic lens mount molded around said periphery of said uncentered lens element and including integrally formed means for retaining said uncentered lens element by said periphery thereof, said lens mount having a geometrical axis and said retaining means being formed to compensate for the eccentricity between said geometrical and optical axis of said uncentered lens element thereby causing said optical axis of said uncentered lens element to be concentric with said geometrical axis of said mount;

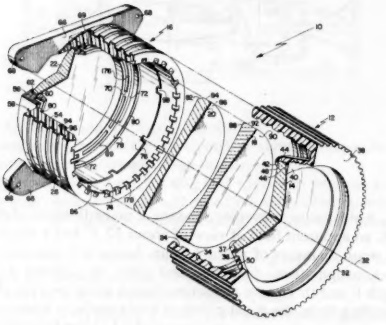
at least one centered lens element, having coincidental optical and geometrical axes, which is to be mounted in said plastic mount in optical alignment with said optical axis of said uncentered lens element retained in said mount;

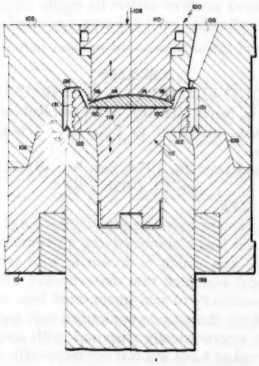
means integrally formed with said mount, when said mount is molded around said uncentered lens element, for supporting said at least one centered lens element in said mount and for aligning said at least one centered lens

element so that said optical axis of said at least one centered lens element and said optical axis of said uncentered lens element, held in said mount, coincide with each other and said geometrical axis of said mount; and

means integrally formed with said molded mount, when said mount is formed about said uncentered lens element, and being deformable, after said at least one centered lens element is supported and aligned in said mount, for engaging and retaining said at least one centered lens element in said mount in its said aligned relationship with said uncentered lens element.

7. A multi-element lens assembly for use with photographic apparatus of the type including a between-the-lens shutter and/or aperture defining mechanism, said lens assembly comprising:





an uncentered lens element having a geometrical axis and an optical axis which is eccentric with respect to said geometrical axis such that diametrically opposed points along a periphery of said uncentered lens, measured radially from said geometrical and optical axes, are symmetrically disposed with respect to said geometrical axis but are not symmetrically disposed with respect to said optical axis;

a plastic lens mount molded around said periphery of said uncentered lens and including integrally formed means for supporting and retaining said uncentered lens element by its said periphery, said lens mount having a geometrical axis and said supporting and retaining means being dimensioned to compensate for the eccentricity between said geometrical and optical axes of said uncentered lens elements thereby causing said optical axis of said uncentered lens element to be concentric with said geometrical axis of said mount;

means integrally formed with said mount, when said mount is molded around said uncentered lens element, for supporting and for retaining at least one other lens element in optical alignment and in axially spaced relationship with said uncentered lens element retained by said retaining means; and

means defining at least one access opening in said mount through which the shutter and/or aperture defining mechanism of the photographic apparatus may move in directions transverse to said geometrical axis of said mount to assume operative positions in an air space between said uncentered lens element and the at least one other lens element, said at least one access opening being integrally formed in said mount when said mount is molded around said periphery of said uncentered lens element.

3,888,569

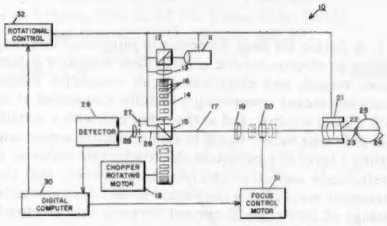
APPARATUS AND METHOD OF MEASURING THE REFRACTIVE ERROR OF AN EYE

Charles R. Munnerly, Fairport; Bruce R. Obinson, and James W. Horwitz, both of Rochester, all of N.Y., assignors to Tropel, Inc., Fairport, N.Y.

Continuation of Ser. No. 358,702, May 9, 1973, abandoned. This application Apr. 29, 1974, Ser. No. 465,274

Int. Cl. A61b *3/00, 3/10;* **G01n** *21/46*

U.S. Cl. 351—6 **26 Claims**



1. In a method of measuring the refractive error of an eye by directing a pattern of radiant energy into said eye and detecting the focus of the radiant energy reflected from said eye, the improvement comprising:

a. converting the analog signal from said focus detection to a digital signal stream;

b. feeding said digital signal stream to a digital computer;

c. programming said digital computer to vary the focus and orientation of said radiant energy pattern directed into said eye;

d. storing selected results of said digital signal stream in said computer; and

e. programming said computer to use an algorithm to calculate said refractive error from said selected signal results.

3,888,570

FILM GUIDING PLAYBACK AND RECORDING MECHANISM

Joseph A. Stella, Peabody, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed June 28, 1973, Ser. No. 374,657

Int. Cl. G03b *31/02*

U.S. Cl. 352—29 **2 Claims**

1. Means for use in transcribing and broadcasting sound in conjunction with a moving film strip having a magnetic sound track on one face thereof and a photographic emulsion and a processing composition on the opposite face thereof, including:

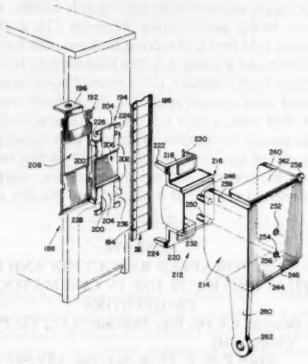
a base;

means connected to said base and initially spaced from said film strip for resiliently supporting said film strip;

said supporting means being configured so as to prevent same from contacting said processing composition after engagement with said film strip whereby said film strip may pass over said supporting means without any attendant interference with the processing of a photographic image;

means for moving said film strip into and out of engagement with said resilient supporting means;

said film strip being adapted to record a photographic image on a central portion of said opposite face and said supporting means being adapted to engage and resiliently support said film strip at spaced edge portions on opposite sides of said central portion;



a cassette for receiving and storing said film strip with said base forming a part of said cassette, said resiliently supporting means being disposed within said cassette;

said cassette comprising means forming an optical path through said film strip for cooperation with a photographic camera to effect exposure of said emulsion and the recording of said image and for cooperation with film drive and projection apparatus for the viewing of such image;

said cassette being provided with means for coating the emulsion bearing face of said film strip with said processing composition subsequent to said exposure to develop said image for subsequent viewing;

means cooperable with said resiliently supporting means for magnetically recording audio signals onto said sound track and for playing back such recorded signals, said magnetically recording means including a transducer adapted to engage at least a portion of said sound track and cooperable with said resiliently supporting means whereby said transducer means will move said film strip into engagement with said supporting means such that said film strip will be sandwiched between said transducer and said supporting means and be resiliently biased toward said transducer by said supporting means;

said transducer and said resiliently supporting means being provided with cooperating locating means for registering said transducer with respect to said supporting means;

guide means connected to said transducer for engaging the edges of said film strip and cause same to follow a predetermined path and maintain a given registration between said transducer and said sound track;

a frame member connected to one of said photographic camera and said film drive and projection system and further including means connected between said magnetically recording means and said frame member for biasing said transducer toward said film strip; and

means for moving said transducer between an idle position out of engagement with said sound track and an operative position in engagement with said sound track;

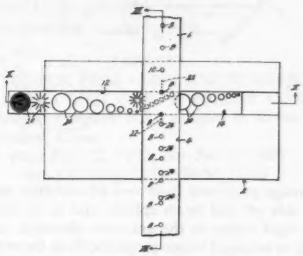
said guide means comprising plural rigid locating members adapted to extend over one edge of said film strip and engage said supporting means and plural resilient members adapted to extend over the opposite edge of said film strip and engage said supporting means, whereby said film strip will be guided between said locating members and said resilient members during its movement.

3,888,571

MOTION PICTURE TOY

John C. Schmidt, 2307 Castilla Isle, Fort Lauderdale, Fla. 33301

Filed May 8, 1974, Ser. No. 468,073
Int. Cl. G03b *21/32*
U.S. Cl. 352—87 **4 Claims**



1. A device for assisting in the production of hand-drawn images on a flexible, at least semi-transparent motion picture film tape in successively longitudinally spaced apart areas, or "frames" thereof, said device comprising:

a. a generally planar base having a groove formed in one face thereof having a width corresponding to that of said tape, and through which said tape may be advanced longitudinally to dispose each successive frame thereof over a specified area of the floor of said groove,

b. locator meams operable to position any selected frame of said tape accurately over said specified area of the floor of said groove, and

c. an image display means carried by said base and operable to display a pre-formed image in said specified area of the floor of said groove, said pre-formed image being viewable through said tape to serve as a guide for hand-drawing an image on the frame of said tape overlying said specified area, said image display means comprising duplicating means covering the floor of said tape groove to reproduce a veiwable duplicate of an image hand-drawn on said tape as it overlies said duplicating means, whereby after one image is so hand-drawn and duplicated, the next successive frame of said tape may be positioned over said duplicate image, so that the latter may serve as a guide for hand-drawing an image on said next successive tape frame.

3,888,572

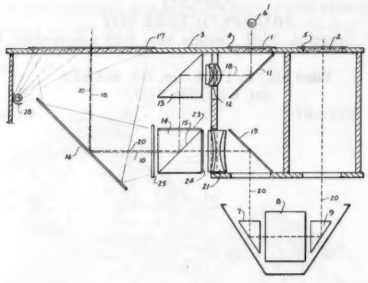
METHOD AND APPARATUS FOR MAKING ANIMATED CARTOONS

Jean Veran Dejoux, Los Angeles, Calif., assignor to Optical Systems Corporation, Los Angeles, Calif.

Filed Apr. 21, 1971, Ser. No. 135,931
Int. Cl. G03b *19/18, 21/32*
U.S. Cl. 352—87 **4 Claims**

1. Apparatus for making animated cartoons and for viewing enlarged images of sequences thereof, comprising, a drawing table having at least two drawing windows therein of equal dimensions, and another viewing window therein of enlarged

dimensions which are multiples of the corresponding dimensions of said drawing windows, means for projecting onto said viewing window of enlarged dimensions equally enlarged images of film frames exposed at each of said first windows, said enlarged images being projected onto said viewing window in superposed relation, which said means includes two separate magnifying lens systems, one of which enlarges the image projected from one of said drawing windows, and the other of which enlarges the image projected from the other of said drawing windows, a beam splitter, means for causing an



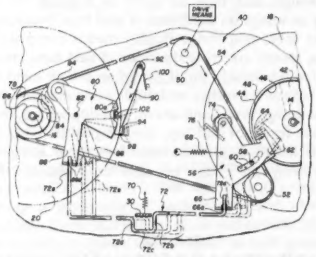
enlarged image projected from one of said first windows to enter one side of said beam splitter and to be reflected to emerge at right angles to the entrance direction, and means for causing an enlarged image projected from the other of said first windows to enter another side of said beam splitter at right angles to said first side to emerge on an axis coinciding with the axis of said first enlarged image, and a mirror adapted to intercept the coinciding images emerging from said beam splitter to reflect them onto said window of enlarged dimensions.

3,888,573

CONTROL MECHANISM FOR A WEB TRANSPORTING DEVICE

Donald O. Easterly, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed July 25, 1973, Ser. No. 382,621
Int. Cl. G03b *1/00*
U.S. Cl. 352—166 **12 Claims**



1. A control mechanism for a motion picture projector, said control mechanism comprising:

a. first and second spindles rotatably supported by said motion picture projector;

b. first drive means adapted to cooperate with and to rotatably drive said first spindle;

c. second drive means adapted to cooperate with and to rotatably drive said second spindle, said second drive means including (1) clutch means including

i. a rotatably-powered driving member; and

ii. a driven member frictionally coupled to said driving member such that said driven member is adapted to transmit an increased driving torque to said second spindle as a function of an increased force applied to said driver member; and

iii. force applying means movable between a first condition wherein said force applying means is effective to apply an increased force to said driven member and a second condition wherein said force applying means is restrained from applying an increased force;

d. first and second brake means adapted to cooperate with and to brake rotation of said first and second spindles, respectively; and

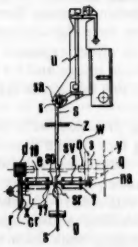
e. control means adapted to control said first and second drive means, said first and second brake means, and said force applying means of said clutch means, said control means being positionable between (1) a still position wherein said first and second brake means cooperate with said first and second spindles respectively to restrain said spindles from rotation, (2) a project position wherein said second drive means rotatably drives said second spindle at a first rate, (3) a rewind position wherein said first drive means cooperates with said first spindle and rotatably drives said first spindle, and (4) a fast forward position wherein said second drive means rotatably drives said second spindle at a second and greater rate.

3,888,574

MECHANISM FOR SPEED REDUCTION AND STOPPING THE FILM DRIVE FOR USE IN CINEMATOGRAPHIC PROJECTORS

Roberto Bencini, c/o Dr. Ing. Misitano A.G., Via Padova, 217, 20-27 Milan, Italy

Filed Feb. 4, 1974, Ser. No. 439,559
Claims priority, application Italy, Feb. 15, 1973, 20449
Int. Cl. G03b *1/22*
U.S. Cl. 352—194 **3 Claims**



1. A mechanism for speed reduction and stopping of the film drive for use in cinematographic projectors, comprising a per se known claw drive acted on by first and second cams so as to give the claw end a rectangular profiled path, an elongated cam member displaceable between three operating positions, pusher means located on each side of the said elongated cam member and mounted to be displaceable laterally of the elongated cam member, one pusher means being adapted to co-operate with further cam means and the other pusher means being adapted to co-operate with the claw end, one position of the elongated cam member corresponding to the inoperative position of both pusher means, a second position of the elongated cam member effecting movement of said other pusher means to displace the claw end such that one of the first and second cams ceases to reciprocate the claw end, such that film transport ceases, the third position of the elongayed cam member coupling the pusher means so that said further cam means periodically causes said pusher means to inhibit the reciprocation of said claw end which results from

the action of one of said first and second cams such that the speed of film transport is reduced.

3,888,575

PREFABRICATION PRIMER FOR HIGH TENSILE STEEL

Masao Fujii, Okayama; Shiro Shimatani; Ryoji Orita, both of Tamano, and Isao Takemoto, Osaka, all of Japan, assignors to Mitsui Shipbuilding and Engineering Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 143,553, May 14, 1971, abandoned. This application Dec. 7, 1972, Ser. No. 312,908

Int. Cl. H01b *1/00*

U.S. Cl. 252—513 **1 Claim**

composition	test item			
	outdoor exposure test result		humidity resistance test result (coated)		salinity test result
	2 months	4 months	zinc epoxy primer	phenoxy resin	X-ray inspection
no paint	overall rusting	overall rusting	×	△	1 class
phenoxy resin solution only	50% rusting	*	○	○	2 class
phenoxy resin+40_2Fe-Si	no change	5% pitting	◎	◎	1 class
phenoxy resin+40_2Fe-Si zinc powder	*	no change	◎	◎	*
phenoxy resin+40_2Fe-AL	*	20% pitting	◎	◎	*
phenoxy resin+40_2Fe-AL zinc powder	*	no change	◎	◎	*
ethyl silicate solution+40_2Fe-Si	*	10% pitting	◎	◎	*
ethyl silicate solution zinc powder	*	no change	◎	◎	*
ethyl silicate solution+40_2Fe-AL	*	10% pitting	◎	◎	*
ethyl silicate solution+40_2Fe-AL zinc powder	*	no change	◎	◎	*
zinc rich paint	*	*	◎	◎	4 class
wash primer	20% pitting	overall rusting	△	○	2 class

NOTE
1) ◎—very good ○—good △—ordinary ×—no good
2) The wet-ability test for steel plate with no paint film was conducted immediately after removal of rust by sand blasting.

1. A prefabrication primer paint composition comprising a paint base selected from the group consisting of an ethyl silicate solution and a phenoxy resin; a semiconductive pigment selected from the group consisting of ferroaluminum, ferrosilicon, ferromanganese, ferrochromium, silicon and iron oxide; a rust preventative pigment selected from the group consisting of zinc and aluminum; said paint base semiconductive pigment and rust preventative pigment being present in the primer paint in a sufficient quantity such that a solid film of said primer paint contains from about 10 to about 45% of said paint base, about 5 to about 65% of said rust preventative pigment, balance of said semiconductive pigment.

3,888,576

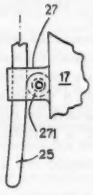
FILM PROJECTORS

Francis Bolgar, 24 Karamu St., and John James Fraser, 194 Helston St., both of Wellington, New Zealand

Continuation-in-part of Ser. No. 278,196, Aug. 7, 1972, abandoned. This application Sept. 23, 1974, Ser. No. 508,647

Int. Cl. G03b *21/22*

U.S. Cl. 353—76 **6 Claims**



1. An apparatus for projecting the image contained on transparent film onto a screen set at a fixed distance from the film, said apparatus being contained in a cabinet and including an optical arrangement whereby light issuing from a lamp is beamed through a primary condensing lens so as to emerge in a parallel beam and pass through a heat shield, reflect off a mirror, pass through a secondary condensing lens and converge through the film to a point within the boundaries of a projecting lens, diverge out of the projecting lens and pass onto a pair of angularly disposed reflecting surfaces before being reflected onto a transparent screen, and wherein the distance between the reflecting surfaces and the projecting lens and screen can be altered while a corresponding adjusting movement to the projecting lens is simultaneously effected to maintain the image in focus on the screen; characterised in that the adjusting movement is effected by means of a cam arrangement comprising a vertically disposed, elongated camming member pivoted at its upper end to said cabinet, a link pivotally connected to said camming member adjacent said upper end thereof, and connected to an arm carrying said projecting lens, and a cam-follower provided on a framework supporting the reflecting surfaces and slidably engaging the camming member; the camming member being shaped in such a manner that as the framework supporting the reflecting surfaces moves towards or away from the screen, the camming member is caused to pivot and thus to move said link which in turn moves said arm to produce said corresponding adjusting movement to the projecting lens.

3,888,577

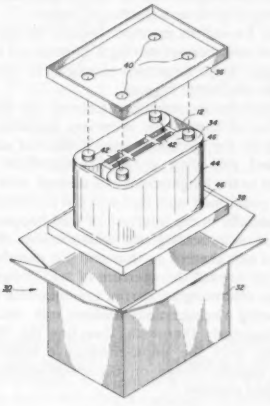
APPARATUS FOR PACKAGING AND SUBSEQUENTLY INSTALLING A BELT ONTO A ROLLER ASSEMBLY

Edwin A. Meyer, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Feb. 12, 1973, Ser. No. 331,400

Int. Cl. G03g *15/00;* **B65d** *71/00*

U.S. Cl. 355—3 R **5 Claims**



1. The combination of:

a. a printing machine having a roller assembly, said roller assembly having a plurality of rollers mounting for rotation about at least substantially parallel axes, said roller assembly being adapted to move an endless photoconductive belt around a closed path;

b. means including a container for storing said belt until the latter is to be mounted upon said roller assembly, and means adapted to be positioned within said container for expanding and carrying said belt under tension;

c. means for supporting said expanding and carrying means on one end of said roller assembly when it is desired to move said belt onto said roller assembly; and,

d. wherein said means for expanding and carrying said belt under tension includes means for releasing the tension on said belt while said expanding and carrying means is supported on said roller assembly so that said belt may then be moved onto said roller assembly.

3,888,578

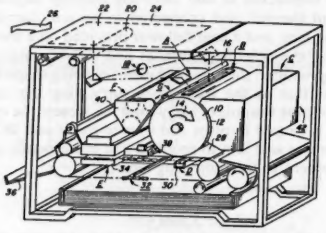
DEVELOPMENT APPARATUS FOR ELECTROPHOTOGRAPHIC PRINTING MACHINE

Yoshio Eto, Omiya, Japan, assignor to Rank Xerox, Limited, London, England

Division of Ser. No. 290,195, Sept. 18, 1972, Pat. No. 3,835,811. This application Jan. 30, 1974, Ser. No. 438,125

Int. Cl. G03g *15/00*

U.S. Cl. 355—3 DD **4 Claims**



1. An electrophotographic printing machine of the type having a corona generating device for charging a photoconductive surface to a substantially uniform level, and an exposure mechanism for irradiating the photoconductive surface with a light-image to record thereon an electrostatic latent image of an original document to be reproduced, wherein the improvement includes:

means for forming a flow of carrier granules moving from a storage region to a discharge region;

a hopper having an aperture therein in the lower region thereof, said hopper storing a quantity of toner particles arranged to be dispensed through the aperture therein into the discharge region;

a shaft member mounted pivotably in said hopper;

a plurality of spaced pin members mounted substantially fixedly on the circumferential surface of said shaft member and extending outwardly therefrom substantially normal to the longitudinal axis thereof, said shaft member being positioned such that said pin members are disposed substantially in the aperture of said hopper;

means for reciprocating said shaft member about the longitudinal axis thereof so that said pin members feed toner particles toward the aperture of said hopper; and

means for intermingling carrier granules with toner particles producing a substantially uniform mix, and, substantially simultaneously therewith, directing the flow of mix to cascade over the photoconductive surface creating a toner powder image on the electrostatic latent image recorded thereon.

3,888,579

DIGITAL CONTROLLED DOCUMENT FEEDER

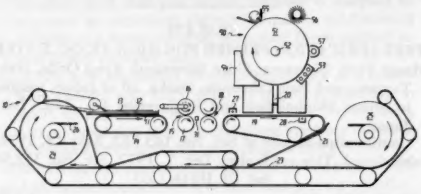
Victor Rodek, Rochester, and Raymond G. Ticknor, Fairport, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Jan. 31, 1974, Ser. No. 438,489

Int. Cl. G03g *15/04, 15/00*

U.S. Cl. 355—14 **5 Claims**

1. Sheet feeding and processing apparatus comprising, first sheet conveyor means, second sheet conveyor means, cyclic processing means including an electrostatic photocopier having an endless and repetitively cycling photoreceptor cooperating with a sheet on said second conveyor means, means for identifying the cyclic position of said photoreceptor, means between said first and second conveyor means for detecting the presence of a sheet, means for relating the detection of a sheet by said detection means to the cyclic position of said photoreceptor as determined by said identifying means, and means responsive to said relating means for momentarily varying the speed of said first conveyor means to correct any deviation from a predetermined relationship between said



cyclic position of said processing means and said detection of the presence of a sheet.

3,888,580

PROCESS OF AND SYSTEM FOR PRINTING IN COLOR PHOTOGRAPHY

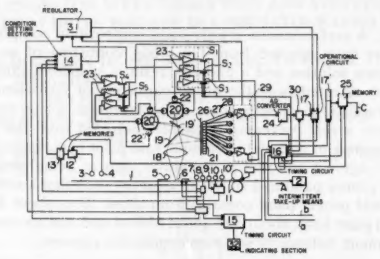
Tadashi Amano, and Ryuichi Andoh, both of Tokyo, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed May 23, 1973, Ser. No. 363,266

Claims priority, application Japan, May 25, 1972, 47-051176

Int. Cl. G03b *27/76*

U.S. Cl. 355—38 **5 Claims**



1. A process for printing in color photography comprising:

measuring a plurality of kinds of densities of a photographic film to be printed;

selecting, in accordance with the results of said measurement, one of a plurality of sets of sorted codes derived from previously encoded densities regarding photographic films expected to be printed, each of which codes in the set belongs to one kind of said plurality of kinds of densities;

storing said selected set;

printing said film in accordance with signals from codes of said stored set, said signals comprising correction signals for correcting exposure time, said correction signals being in accordance with a whole area transmittance density, a maximum transmittance density, a minimum transmittance density and a peripheral area transmittance density.

3,888,581

SEMI-AUTOMATIC DOCUMENT HANDLER

John R. Caldwell, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 8, 1974, Ser. No. 449,401

Int. Cl. G03b *27/62*

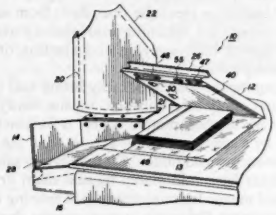
U.S. Cl. 355—64 **9 Claims**

1. In a copying apparatus with a transparent document copying platen and scanning optical imaging means beneath said platen for imaging a stationary document on said platen,

and a platen overlayable platen cover, said platen cover including uniform planar stationary document flattening surface means for holding documents of up to a predetermined maximum thickness substantially flatly against said platen for stationary copying, the improvement in automatically ejecting documents on said platen from said platen after copying comprising:

document engaging sheet drive means in said platen cover for ejecting documents from said platen,

said drive means extending through said stationary document flattening surface means for driving document engagement;



means for selectively briefly driving said drive means in response to the completion of copying of a document on said platen to eject a document from said platen,

retaining means for retaining said platen cover over said platen during both copying and ejecting of documents from said platen,

and spacing means for holding said platen cover stationary document flattening surface means slightly uniformly spaced above said platen, while said platen cover is retained over said platen, by a pre-set spacing which is greater than said predetermined maximum thickness for facilitating said ejection of documents from said platen by said sheet drive means.

3,888,582

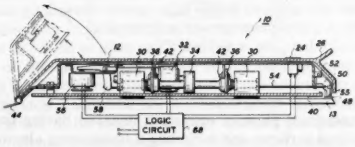
SEMI-AUTOMATIC DOCUMENT HANDLER

Augustus W. Griswold, Rush, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 8, 1974, Ser. No. 449,307

Int. Cl. G03b *27/76*

U.S. Cl. 355—69 **7 Claims**



1. In a copying apparatus with a document copying platen and an overlayable platen cover holding documents against the platen for copying, the improvement comprising:

platen cover latching means for retaining said platen cover over said platen for the copying of documents on said platen,

said latching means comprising a permanent magnetic latch between said platen cover and said copying apparatus which can be manually unlatched merely by manual lifting of said platen cover,

said latching means including automatic unlatching means for automatically unlatching said platen cover subsequently to the completion of said copying of documents on said platen,

said copying apparatus further including automatic platen cover lifting means for automatically lifting said platen cover away from said platen when said latching means is unlatched,

and wherein said automatic unlatching means comprises electrically driven mechanical camming means forcibly camming said platen cover away from said copying apparatus sufficiently to slightly separate and unlatch said permanent magnetic latch so that said automatic platen cover lifting means lifts said platen cover away from said platen subsequent to the completion of said copying of documents on said platen.

3,888,583

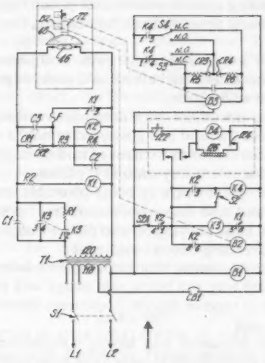
ILLUMINATING SYSTEM WITH GAS DISCHARGE LAMP USED AT LOW AND HIGH POWER LEVELS

Edward J. Kiefer, and Dale W. Rogers, both of Toledo, Ohio, assignors to Holophane Company Incorporated, New York, N.Y.

Division of Ser. No. 166,034, July 26, 1971, Pat. No. 3,760,226. This application July 26, 1973, Ser. No. 383,034

Int. Cl. G03b *27/76*

U.S. Cl. 355—71 **4 Claims**

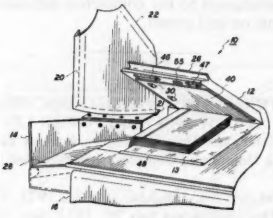


1. An illuminating system comprising a gas discharge lamp, a housing for said lamp, a circuit including a transformer connected with a supply of alternating current for the lamp, a circuit for the lamp including a capacitor in series with the secondary of the transformer and the gas discharge lamp for low power operation of the lamp, a timer adapted to be adjusted to time the duration of high power operation of the lamp, relay means operable through the timer to short out the capacitor to establish high power operation of the lamp during the period for which the timer is adjusted, relatively movable shutter means comprising a sheet of flexible material associated with said housing, flexible cable means connected with the end regions of the sheet of flexible material, a motor having a drive roll engaging the cable means for actuating said sheet of material, said sheet being operable when in open position to pass light from the gas discharge lamp and in closed position to substantially impede the passage of light from the lamp, and second relay means energized through the timer to actuate the motor to move the sheet of material to open position, said second relay means being operable when the time period for high power operation of the lamp expires to connect the capacitor in series with the lamp for low power operation and to energize the drive motor to move the sheet of material to closed position.

3,888,584
SEMI-AUTOMATIC DOCUMENT HANDLER

Craig A. Smith, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 8, 1974, Ser. No. 449,402
Int. Cl. G03l *27/62*
U.S. Cl. 355—75 **3 Claims**



1. In a copying apparatus with a generally horizontal document copying platen, said platen extending to one edge of said copying apparatus to provide for book copying on said platen with a portion of the book extending beyond said edge, and further including a platen overlayable platen cover for holding document sheets on said platen for copying, the improvement comprising:

upper and lower document trays, both mounted to said apparatus extending beyond said same edge from closely adjacent said platen,

said upper document tray normally overlying said lower document tray and being adapted to hold a stack of documents therein for movement of said documents from said upper document tray onto said platen,

said upper document tray being pivotable away from said platen and said lower document tray to provide unobstructed book copying on said platen with a portion of the book extending beyond said edge,

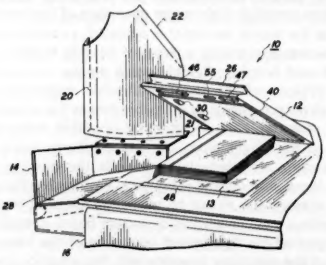
said lower document tray being spaced below said upper document tray and below said platen and positioned and formed to receive therein documents removed from said platen, and

said lower document tray having a supporting surface extending downwardly sloping away from said platen at said edge for supporting the otherwise unsupported portion extending beyond said edge of a book being copied on said platen.

3,888,585
SEMI-AUTOMATIC DOCUMENT HANDLER

Thomas R. Cross, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 8, 1974, Ser. No. 449,572
Int. Cl. G03b *27/62*
U.S. Cl. 355—75 **10 Claims**



1. In a copying apparatus with a transparent document copying platen and optical imaging means beneath said platen for imaging a stationary document on said platen, and a platen overlayable platen cover, said platen cover including uniform document flattening surface means for pressing documents substantially flatly against said platen for stationary copying, the improvement in automatically ejecting documents on said platen from said platen after copying comprising:

document engaging sheet drive means in said platen cover for ejecting documents from said platen,

said sheet drive means extending through said document flattening surface means for driving document engagement;

means for selectively briefly driving said sheet drive means in response to the completion of copying of a document on said platen to eject the document from said platen,

retaining means for retaining said platen cover over said platen during both copying and ejecting of documents from said platen,

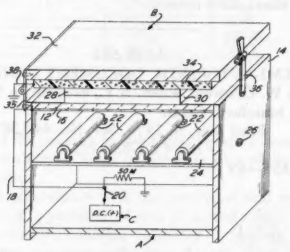
and spacing means for temporarily lifting said platen cover document flattening surface means away from said platen, while said platen cover is retained over said platen, by a spacing which is greater than the thickness of a document on said platen, for facilitating said ejection of documents from said platen by said sheet drive means,

and control means for controlling said spacing means to lift said document flattening surface means away from said platen during said driving of said sheet drive means but not during said copying of said documents.

3,888,586
CONTACT PRINTING APPARATUS WITH ELECTROSTATIC HOLD-DOWN

Richard J. Arden, Wilmington, Del., and Harold A. Schweriner, Hatfield, Pa., assignors to The Simco Company, Inc., Lansdale, Pa.

Filed Feb. 4, 1974, Ser. No. 439,036
Int. Cl. G03b *27/02*
U.S. Cl. 355—78 **2 Claims**



1. Contact printing apparatus comprising:

a transparent plate of insulating material having first and second surfaces and including a transparent electrode of electrically conductive material in contact with and substantially covering the first surface thereof,

means for applying a D.C. high voltage with respect to ground on said transparent electrode,

means for directing light through said transparent electrode and said transparent plate,

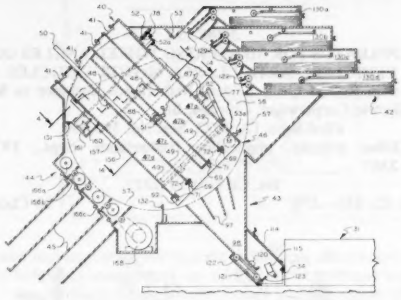
a rigid cover for movement toward the second surface of said transparent plate,

a conductive pad of compressively yielding material on said cover for resilient surface-to-surface contact with abutting sheets of material electrostatically laminated to the second surface of said transparent plate, and

means for connecting said pad to ground, whereby pressing said conductive pad against the sheets electrostatically laminated to the transparent plate will increase the electrostatic force holding the sheets together and to the surface of said transparent plate and provide wrinkle-free

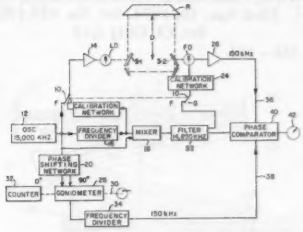
flat disposition preparatory to exposure of the laminate to light.

3,888,587
LIGHT-PROOFED RADIOGRAPHIC CASSETTE UNLOADER AND RELOADER
Theodore Perl, 58 Ely Dr., Fayetteville, N.Y. 13066
Filed July 11, 1974, Ser. No. 487,575
Int. Cl. G03g *27/14;* **H05g** *1/60*
U.S. Cl. 355—112 **4 Claims**



1. A light-proofed radiographic cassette unloader-reloader adapted for use with an automatic film processor and for use with a hinged cassette having a narrow flap along its opening side adapted to raise a film edge above the cassette base edge when the cassette lid is raised, comprising: a light-proofed cabinet, a magazine rotatably mounted within the cabinet and having at least one compartment means therein adapted to slidingly receive a cassette, the compartment means being open at one end and provided with cassette arresting stop means at the other end, means for turning the magazine from a first position in which the compartment floor is inclined at substantially 45° in one direction from vertical to a second position in which the floor is inclined at substantially 45° in the opposite direction from vertical, the cabinet having a cassette insertion station in which insertion door means register with the open end of the compartment means when the magazine is in its first position, the cabinet having an unloading station in which film-guide passage means register with the stop means end of the compartment means when the magazine is in its first position and means for passing unloaded film to the processor, the magazine having motor-operated means for unlocking cassettes therein and lifting cassette lids when the magazine is in its first position, the cabinet having a reloading station in which at least one chamber is adapted to contain a stack of film sheets of a size to fit the cassettes and downwardly inclined film supply passage means adapted to register with the stop means end of the compartment means when the magazine is in its second position, the compartment means having releasable latch means for holding the cassette therein adjacent the stop means end of the compartment means and the lid lifting means being adapted to maintain the cassette open when the magazine is turned from its first to its second position, means in the chamber for advancing and expelling a single sheet of film on demand through the film supply passage, the cabinet having a cassette ejection station in which cassette closing means and ejection door means register with the open end of the compartment means when the magazine is in its second position, and means in the magazine for releasing the releasable latch means, the releasing means being controlled at the ejection station; whereby a cassette falls to the stop means end of the compartment means when inserted, the exposed film falls and is carried to the processor when the cassette is opened, a fresh sheet of unexposed film falls into the open cassette after the magazine is turned to its second position, and the cassette is ejected when the latch means is operated.

3,888,588
INSTRUMENT FOR MEASURING DISTANCE
Carl-Erik Granqvist, Tulevagen 18, Lidingo, Sweden
Filed Jan. 30, 1973, Ser. No. 328,086
Claims priority, application Sweden, Feb. 3, 1972, 001220/72
Int. Cl. G01c *3/08;* **G01s** *9/04*
U.S. Cl. 356—5 **11 Claims**



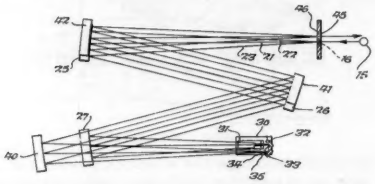
1. An instrument for measuring distance utilizing two signal paths, one signal path being outside of the instrument for radiant energy transmitted to and received from a distant object and the other signal path comprising an internal signal channel for a signal at a high frequency, said internal signal channel including a variable delay device for shifting by controllable amounts the phase of the high frequency signal and a first frequency divider for the shifted signal having an output signal at a lower frequency that has a phase accuracy which is a multiple of the accuracy of the variable delay device; a radiant energy signal generator; means for modulating the radiant energy signal from said generator at a first frequency; a receiver for said radiant energy signal including means responsive to the reception of said radiant energy signal for producing a signal at said lower frequency; and a phase comparator circuit for indicating a predetermined relationship between the phases of the two signals at said lower frequency.

3,888,589
REFLECTION GRATING OPTICAL ODOMETER
David William Swift, Prestatyn, Wales, assignor to Pilkington P-E Limited, Flintshire, Wales
Filed Feb. 11, 1974, Ser. No. 441,473
Int. Cl.[2] G01P *3/36;* **G02B** *5/08*
U.S. Cl. 356—28 **6 Claims**

1. Apparatus for measuring displacement or velocity relative to a surface above which said apparatus is independently supported for travel relative to the surface said apparatus comprising grating and light directing means having several pairs of light reflecting means with the light reflecting means of the several pairs being arranged in alternation and with the light reflecting means in each pair being adapted to reflect incident light received from the surface in two different gen-

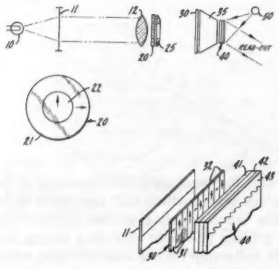
eral directions, respectively, thereby to provide separate light signals representative of luminous intensity variations of the surface relative to which the apparatus travels, and means effective to compare said separate light signals and provide an output signal derived from the difference therebetween.

3,888,590
GRATING MONOCHROMATOR
John U. White, Contentment Island Rd., Darien, Conn. 06820
Filed Apr. 10, 1974, Ser. No. 459,170
Int. Cl. G01j *3/18*
U.S. Cl. 356—101 **22 Claims**



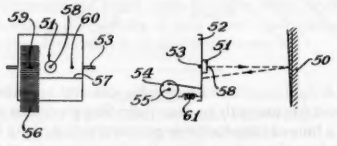
1. Apparatus for producing a portion of a spectrum, comprising, in combination:
- means forming a curved entrance slit for admitting light from a source;
- means forming a curved exit slit;
- first grating monochromator means for dispersing the light admitted through the entrance slit and for forming a curved first dispersed image of the entrance slit;
- second grating monochromator means for receiving light from the first monochromator means and again dispersing the same to form a curved second dispersed image of the entrance slit at the exit slit, the successive dispersions by the first and second monochromator means being in additive relationship with each other; and
- mirror means located between the first and second grating monochromator means and including a convex reflecting surface and a concave reflecting surface for reversing the sense of the first dispersion with respect to the sense of the curvature of the first image, the curvature of the second image being substantially independent of wavelength.

3,888,591
IMAGE SUBTRACTION APPARATUS
Paul G. Roetling, Ontario, N.Y., assignor to Xerox Corporation, Stamford, Conn.
Filed Jan. 21, 1974, Ser. No. 434,855
Int. Cl. G01n *21/40*
U.S. Cl. 356—114 **25 Claims**



1. An image subtraction system comprising:
- encoding means for producing a first encoded image and a second encoded image;
- filtering means, in optical relationship with said encoding means, having a first area for passing said first encoded image and a second area for passing said second encoded image; said first area and said second area being alternately disposed on said filtering means; and
- optical recording means, in optical relationship with said filtering means, responding to the absolute difference between said first encoded image and said second encoded image.

3,888,592
APPARATUS FOR MEASURING WHEEL ANGLES OF VEHICLES, PARTICULARLY MOTOR VEHICLES
Herman Robert Geul, Leiden, Netherlands, assignor to Sun Electric Corporation, Chicago, Ill.
Filed Sept. 13, 1973, Ser. No. 396,990
Claims priority, application Netherlands, Sept., 1972, 7212387
Int. Cl. G01b *11/275*
U.S. Cl. 356—155 **16 Claims**



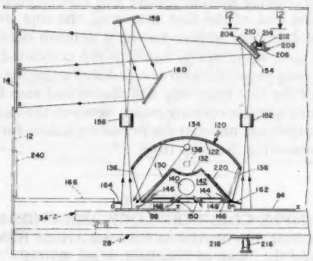
1. A device for measuring the wheel angle on vehicles comprising an optical system including a projector, cooperating with the related wheel, for forming on an image plane an optical pattern consisting of one or more marks, at least one light sensitive element situated in the image plane, means for effecting relative movement between said light sensitive element and the mark (s) of said pattern, respectively, caused by an angular displacement of said projector with respect to a reference position, said relative movement causing signals to be generated in reference positions for enabling the wheel angle concerned to be determined, characterized in that by means of a suitable pattern, projected by the projector, on the light sensitive element, signals are generated which are counted for directly determining the wheel angle.

3,888,593
OPTICAL COMPARATOR AND INSPECTION APPARATUS
Paul S. Kempf, 703 Stratford Ct., Apt. 7, Del Mar, Calif. 92014
Continuation-in-part of Ser. No. 63,180, Aug. 12, 1970, abandoned. This application Oct. 18, 1971, Ser. No. 190,187
Int. Cl. G01b *9/08*
U.S. Cl. 356—164 **14 Claims**

1. An optical comparator and inspection apparatus for comparing a sample component with a master component by comparing respective images thereof comprising,
- a single rear projection viewing screen,
- carriage means including a carriage being slidable longitudinally from front to rear for supporting a sample component and a master component in spaced relation adjacent said screen,
- said carriage means including positioning frame means for fixedly positioning the sample component and reference component in a common plane on said carriage,
- a light source,
- means for focusing light from said light source onto the surface of respective similar portions of the sample component and the master component,
- optical projection means including a lens and mirror system for each component for receiving light images reflected

from the surface of each of the respective components and directing the light images, with one of the images inverted, to a common point of focus on the screen in abutting relationship with one component image being a mirror image at a given demarkation line of the other component image,

light stop means for simultaneously limiting the light images to common lines of demarkation on each component,



and moving means for moving the sample component and reference component on said positioning frame means and carriage means simultaneously in the common plane in a direction perpendicular to the optical axis of the respective lens and mirror systems on an axis longitudinal to a line between the optical centers of the two respective lens and mirror systems and past the light source and light stop means, whereby the two images converge and diverge from the lines of demarkation on the screen.

3,888,594

EXPOSURE CONTROL COMPUTING CIRCUIT

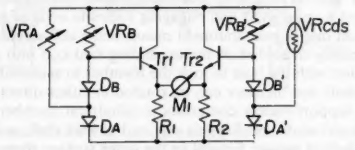
Toshikazu Ichiyanagi, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Japan

Filed Sept. 18, 1973, Ser. No. 398,552

Claims priority, application Japan, Sept. 22, 1972, 47-95307

Int. Cl. G01j 1/44

U.S. Cl. 356—226 **5 Claims**



1. An exposure control computing circuit capable of being set for photographic informations comprising:

bridge circuit means constituting a bridge circuit, said bridge circuit means having

a first and second impedance means incorporated in two arms of the bridge circuit, and

a plurality of logarithmic-operating means incorporated in each of the other two arms of the bridge circuit,

a third and fourth impedance means of which one ends are connected to said first and second impedance means, and the other ends are connected to joints of said logarithmic-operating means, and

an exposure value determining means arranged to be connected between the output corners of the bridge circuit so that when at least two of the first to fourth impedance means are set for photographic informations, an exposure control parameter is derived as an output in the form of a product of the input signals representing the photographic informations to set said exposure value determining means connected between the output corners of the bridge circuit.

3,888,595

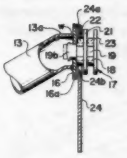
SCAFFOLD CAM LOCK CONSTRUCTION

Ronald G. Morris, Beaver Falls, Pa., assignor to Beaver-Advance Corporation, Ellwood City, Pa.

Filed May 13, 1974, Ser. No. 469,436

Int. Cl. E04g 7/22

U.S. Cl. 403—14 **12 Claims**



1. In a locking connector construction for a scaffold frame or the like which has a latching gusset plate unit for securing on the frame and having a side wall provided with an open-end substantially circular latching slot portion therein; and which also has a latching device for securing on an end portion of a connector member of the frame for movement into and out of latching engagement with the latching slot portion, wherein the latching device has a back flange for securing on the end portion of the connecting member, has a stub shaft secured at its back end to extend from the back flange, has a front guide flange secured on a front end of the stub shaft, and has a latching collar rotatably mounted on the stub shaft between the back and front flanges; wherein the collar carries a guide flange and has a pair of front spaced-apart arcuate-shaped latching lugs projecting from a front side of the guide flange, and the device has a handle operatively mounted for turning movement with said collar; the improvement which comprises, an open entry portion from a front edge of the side wall of the gusset plate unit into the circular latching slot portion thereof, said entry portion being provided by a pair of outwardly diverging and inwardly converging entry edges intersecting said substantially circular latching slot portion to provide an open mouth portion and the maximum inward convergence of said entry edges substantially as a common line edge, said open mouth portion being immediately open to said latching slot portion and defining an opening therebetween of a width substantially corresponding to the diameter of said stub shaft and smaller than the diameter of said latching slot portion, said latching slot portion having a diameter that substantially corresponds to a cross dimension representing the outer diameter of said pair of arcuate-shaped latching lugs as positioned on said stub shaft, said pair of entry edges being configurated to facilitate an inward rolling movement of said pair of latching lugs thereon into bypassing alignment with and through said open mouth portion and into said latching slot portion, and said handle being adapted to thereafter turn said pair of lugs into a locking position within said latching slot portion.

3,888,596

JACKING ANCHOR FOR POST-TENSIONING CONCRETE

William F. Kelly, 100 Bellaire Dr., New Orleans, La. 70124

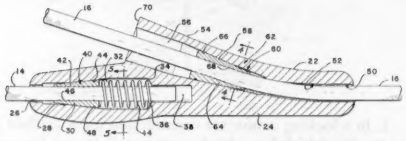
Filed May 23, 1973, Ser. No. 362,908

Int. Cl. F16g 11/04

U.S. Cl. 403—314 **4 Claims**

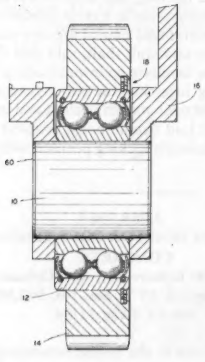
1. An anchor for use in the in-line tensioning by a jack of tendons extending from the opposed faces of a concrete structure to a jacking pocket, the anchor being positioned in the jacket pocket and including:

a. an elongated housing having first and second portions,
b. the opposite ends of said first portion of the housing being provided with first and second longitudinal bores along the common longitudinal axis of the first portion of the housing for receiving ends of the tendons extending from opposite faces of the concrete structure,
c. said first bore terminating in the interior of the housing and said second bore having a generally unobstructed constant diameter throughout,
d. a first movable gripping means in said first bore for holding an end of one tendon,
e. the second portion of the housing being angularly disposed with respect to the said longitudinal axis of the first portion of the housing and extending outwardly at a predetermined angle from the outer surface of the first portion of the housing,



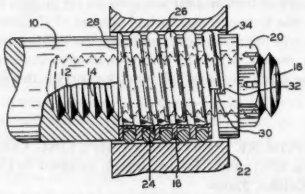
f. said angularly disposed second portion having a bore extending therethrough and in communication with said second longitudinal bore of the first portion of the housing, whereby the other of the tendons may be passed through the second longitudinal bore and the bore of the angularly disposed second portion, said second longitudinal bore communicating solely with said bore in said second portion,
g. the angularly disposed second portion terminating in a face generally transverse to said bore in said second portion and disposed at a predetermined angle to the longitudinal axis of the first portion of the housing to facilitate operative engagement with the jack, and
h. a second movable gripping means in the bore of said angularly disposed second portion for holding the other tendon extending therethrough.

3,888,597
RETAINING ASSEMBLY
Arthur S. Datta, Willow Springs, Ill., assignor to International Harvester Company, Chicago, Ill.
Filed Feb. 24, 1972, Ser. No. 228,998
Int. Cl. F16d *1/06*
U.S. Cl. 403—326 **2 Claims**



1. A retaining assembly for securing an element against axial displacement along a cylindrical member, the cylindrical member having an external annular groove and the element having a bore with a two step internal annular groove therein, comprising:
a first snap ring of the external type seated in the external annular groove and extending radially toward one step of the internal annular groove, the external annular groove having an axial span substantially equal to the axial width of the first snap ring,
a second snap ring of the internal type seated in the one step of the internal annular groove and concentrically engaging one end of the first snap ring, the one step of the internal annular groove having a uniform depth and an axial span substantially equal to the combined width of both snap rings and with one end wall engaging the other end of the first snap ring and the second step forming a reduced annular opening means between the element and the cylindrical member for providing access for inserting and removing the snap rings.

3,888,598
MULTIPLE COIL WIRE LOCK ARRANGEMENT
David Samiran, 148 Northwest Rd., and Arthur H. Moore, 46 Northwest Rd., both of Westfield, Mass. 01085
Filed Dec. 11, 1973, Ser. No. 423,737
Int. Cl. F16d *1/06*
U.S. Cl. 403—372 **6 Claims**

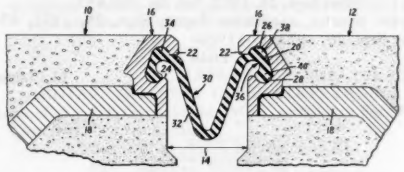


1. In combination; a shaft and a member to be fixed to the shaft and having a hole therein coaxial with the shaft, a multiple convolution helical wire coil disposed in the hole coaxial with said shaft and having ends, support means for said coil, said support means having a helical groove for receiving the inner side of said coil, abutment means nonrotatably connected to said shaft and engaging opposite ends of said coil, at least one of said abutment means being adjustable circumferentially of said shaft for expanding said coil into gripping relation with the hole to lock the member to said shaft so that the shaft and member can be rotated in either direction, and said support means comprises a cylindrical member coaxial with said shaft and fixed to one end of said shaft and having said helical groove formed in the outer surface thereof.

3,888,599
EXPANSION JOINT SEAL
Howard B. Reifsnyder, Williamsport, Pa., assignor to Construction Specialties Inc., Cranford, N.J.
Filed Sept. 20, 1974, Ser. No. 507,664
Int. Cl. E01c *11/02*
U.S. Cl. 404—69 **4 Claims**

1. An expansion joint seal comprising a pair of spaced-apart, elongated frame members positioned substantially parallel to each other, each frame member having in cross-section a generally C-shaped cavity facing inwardly toward the space between the frame members, each such cavity opening toward the space between the frame members at an opening defined between opposed projecting portions of the frame members spaced from each other a distance substantially less than the maximum dimension within the cavity taken generally parallel to the opening, and an elongated resilient gasket sealing the space between the frame members and including a web por-

tion spanning the space and a retaining bead portion extending along each edge of the web portion and received within the cavity of a respective frame member, each retaining bead portion having an outward surface substantially matching and in engagement with the cavity of the respective frame member and having a concavity on its inward surface facing generally inwardly, the concavity of each retaining bead portion of the gasket dividing the retaining bead portion generally centrally



into upper and lower parts and defining a bending zone along which such upper and lower parts are bendable relatively toward each other for substantial reduction of the size of the bead portion such that the bead portion is receivable through the opening of a respective frame member into the cavity thereof, and each retaining bead portion joining the web portion of the gasket exclusively at one of said parts defined by the concavity.

3,888,600

VARIABLE MASS OSCILLATION EXCITER

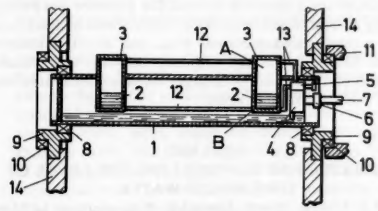
Gulertan Vural, Emmelshausen, Germany, assignor to Koehring GmbH - Bomag Division, Boppard; Rhine, Germany

Filed July 19, 1974, Ser. No. 489,896

Claims priority, application Germany, July 25, 1973, 2337695

Int. Cl.[2] E01C *19/38*

U.S. Cl. 404—117 **14 Claims**



1. An oscillation exciter comprising at least one cylinder, means rotatably mounting said cylinder, means for rotating said cylinder, a piston movably mounted in said cylinder for dividing said cylinder into two chambers, and means for selectively injecting and venting liquid into and from both said chambers to move said piston so as to cause said piston and the liquid contained in said chambers to form an unbalanced mass.

3,888,601

TURBOMACHINE WITH BALANCING MEANS

Larry Earl Glassburn, Olean, N.Y., assignor to General Electric Company, Lynn, Mass.

Filed May 23, 1974, Ser. No. 472,815

Int. Cl. F01d *5/10*

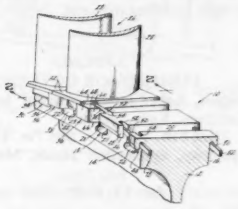
U.S. Cl. 416—144 **8 Claims**

1. A turbomachine with means for balancing thereof comprising:

a rotating member having a plurality of circumferentially spaced apart, generally axially, extending grooves disposed about the outer periphery thereof;

a plurality of blade members having root and airfoil vane portions wherein the root portions are received for retention within the grooves;

a plurality of circumferentially spaced apart integral hook portions extending from a side of the rotating member wherein each integral hook portion has two opposed generally radially extending sidewalls, each one of which is intersected by a generally radially extending groove;



a plurality of balance weights each one of which has a pair of longitudinal and transverse faces intersected by a top and bottom face together with a pair of oppositely projecting tang members wherein each tang member extends from an opposing longitudinal face for engagement within a respective radially extending groove; and

a snap ring for insertion between the hook portions and rotating member for engagement with the bottom of the balance weights.

3,888,602

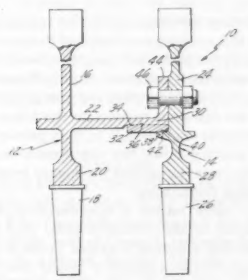
STRESS RESTRAINING RING FOR COMPRESSOR ROTORS

Arnold Douglas Nichols, Simsbury, and Cornelius Vickers Sundt, Windsor, both of Conn., assignors to United Aircraft Corporation, East Hartford, Conn.

Filed June 5, 1974, Ser. No. 476,759

Int. Cl. F01d *5/06*

U.S. Cl. 416—198 **4 Claims**



1. An axial flow compressor for a gas turbine engine comprising:

an upstream compressor disk made from a first material and including an integral, axially extending wing flange having a downstream end, said downstream end including a radially outwardly facing cylindrical surface;

a downstream compressor disk made from a second material adjacent and connected to said upstream compressor disk and including means defining an inner snap diameter surface; and

a restraining ring disposed on said downstream end and having an outer snap diameter surface and a radially inwardly facing cylindrical surface, said radially inwardly facing cylindrical surface abutting said radially outwardly

facing cylindrical surface, said radially inwardly facing cylindrical surface having a free state diameter no greater than the free state diameter of said radially outwardly facing cylindrical surface, said outer snap diameter surface abutting said inner snap diameter surface, said restraining ring having the characteristic that it is stiff relative to the stiffness of said wing flange, said wing flange having the characteristic that it creeps during engine operation, said second material having a creep strength higher than said first material.

3,888,603

COMPRESSOR GOVERNOR

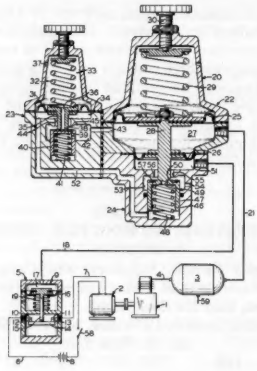
Minoru Nagase, Kobe, Japan, assignor to The Nippon Air Brake Company, Kobe, Japan

Filed Feb. 14, 1974, Ser. No. 442,358

Claims priority, application Japan, Mar. 10, 1973, 48-28404

Int. Cl. F04b *47/00*

U.S. Cl. 417—25 **5 Claims**



1. A compressor governor device for maintaining operating pressure in a storage reservoir supplied thereto by compressor means within upper and lower pressure limits of a prescribed range by controlling operation of switch means having an actuating position for actuating the compressor means when presssure in the reservoir reduces to the lower pressure limit and being operable responsively to fluid pressure to a shut-off position for shutting down the compressor means when the pressure in the reservoir attains the higher pressure limit, said governor device comprising:

a. delivery valve means communicating with a conduit connectable to the switch means, said delivery valve means having a normally closed position in which communication to said conduit is closed and being operable to an open position in which said communication is open and fluid pressure may be delivered to said conduit;

b. an actuator device connectable to the storage reservoir and operable responsively to fluid at said upper pressure limit for effecting operation of said delivery valve means to its said open position, said actuator device being operable responsively to fluid at said lower pressure limit for restoring said delivery valve means to its said closed position,

c. said delivery valve means being communicable with said actuator device whence the fluid pressure delivered by the delivery valve means to said conduit is supplied; and

d. pressure reducing means of the self-lapping type interposed between said actuator device and said delivery valve means for effecting reduction of fluid pressure delivered via said delivery valve means to said conduit to a predetermined low value less than said lower pressure limit.

3,888,604

COMPRESSOR FOR A REFRIGERATING MACHINE

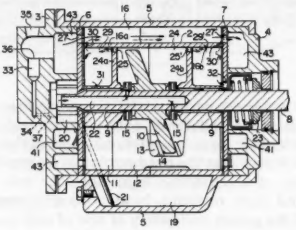
Ryoichiro Oshima; Atsushi Suginuma, both of Hitachi; Atsuo Kishi, Katsuta, and Kenichi Kawashima, Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Sept. 25, 1973, Ser. No. 400,653

Claims priority, application Japan, Sept. 29, 1972, 47-97040; Sept. 29, 1972, 47-119004

Int. Cl. F04b *1/02*

U.S. Cl. 417—269 **11 Claims**



1. A compressor for a refrigerating machine in which rotary movements of a drive shaft are converted into reciprocatory movements of pistons in a crankcase and a refrigerant in a gaseous state is drawn by suction and compressed by a combination of pistons, cylinders, and inlet and discharge valve means, the compressor comprising passage means for maintaining the interior of the crank-case in communication with a low pressure gas passage on the suction side, and oil separating means disposed in said passage means for separating and recovering oil for lubricating the compressor from blow-by gas flowing from the crank-case to said low pressure gas passage including at least two balance holes, each of said balance holes having a small cross sectional area, and an oil separating chamber having a passage disposed between said balance holes, said passage being of a larger cross sectional area than each of said two balance holes.

3,888,605

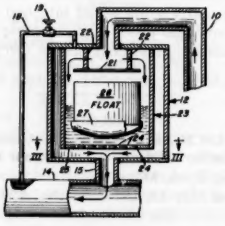
APPARATUS FOR CONTROLLING THE LEVEL OF SUBSURFACE WATER

Edward J. Moore, Morris Township, N.J., assignor to Moretrench American Corporation, Rockaway, N.J.

Filed June 10, 1974, Ser. No. 477,608

Int. Cl. F04b *49/04*

U.S. Cl. 417—279 **6 Claims**



1. Apparatus for controlling the level of subsurface water and comprising,

a. a float chamber having a plurality of openings formed in the bottom wall thereof,

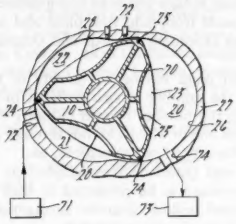
b. a float in said chamber,
c. a flexible member secured to the bottom of the float and spanning the said openings,
d. a header pipe communicating with the said openings,
e. a pump connected to said header pipe for producing sub-atmospheric pressure within said header pipe,
f. a vertical pipe sunk in the ground and connected to said float chamber, said pipe having an inlet opening at the lower end portion thereof, and
g. means forming an air passageway between the header pipe and the top of the float chamber.

3,888,606

ROTARY INTERNAL COMBUSTION ENGINE

James C. Uy, Dearborn Heights, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 26, 1973, Ser. No. 428,530
Int. Cl. F01c *21/00*
U.S. Cl. 418—179 **3 Claims**



1. In a rotary internal combustion engine, a rotor journal for movement within said engine, to assist in defining a plurality of variable volume combustion chambers, the rotor comprising:
a. a metallic substrate body presenting a plurality of angularly connected outer walls each facing said chamber, said body having at least one channel interrupting each of said walls,
b. an insulating coating adherent on said walls and channels for reducing heat transfer from said combustion chambers to the interior of said substrate body, said insulating coating being selected from the group consisting of magnesium oxide, mica, expanded stabilized zirconia, and thorium oxide, said insulating coating having a thickness in the range between 0.0005 and 0.01 inches, and
c. heat conductive means covering said insulating coating effective to quench the temperature of any zone of said coating to prevent unwanted preignition of gases within said combustion chambers, said heat conductive means comprising a coating of material selected from the group consisting of copper, aluminum, iron, nickel, chromium and alloys thereof.

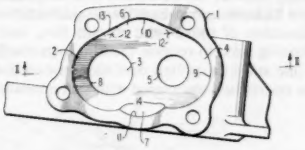
3,888,607

GEAR OIL PUMP, ESPECIALLY FOR MOTOR VEHICLE INTERNAL COMBUSTION ENGINES

Manfred Flaig, Stuttgart, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

Filed June 1, 1973, Ser. No. 366,147
Claims priority, application Germany, June 3, 1972, 2227119
Int. Cl. F04c *1/08*
U.S. Cl. 418—206 **18 Claims**

1. A gear oil pump with axial housing means, said housing means being provided with first axial wall means for forming substantially cylindrical spaces for the arrangement of gears therein, wall means defining inlet space means, and discharge space means, characterized in that the inlet space means together with the substantially cylindrical spaces for the gears, form inlet edges which are axially bevelled with respect to said first wall means to form bevelled off portions, and the bevelled off portions form within the area of an inlet into the inlet space



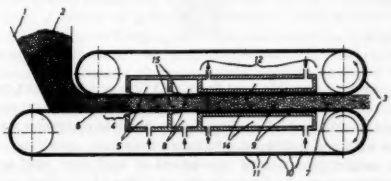
means an at least approximately tangential transition of the walls of the inlet space means into the walls of the cylindrical spaces for the gears.

3,888,608

APPARATUS FOR THE CONTINUOUS MANUFACTURE OF ENDLESS FOAMS

Norbert Holl, Battenberg, Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed July 15, 1974, Ser. No. 488,786
Claims priority, application Germany, July 14, 1973, 2335892
Int. Cl. B29c *25/00*; **B29d** *27/00*
U.S. Cl. 425—4 C **3 Claims**



1. An apparatus for the continuous manufacture of endless foams from prefoamed particulate plastics capable of further expansion and consisting of means for filling the preformed particles into a channel formed by moving gas-permeable walls and stationary side walls and extending from said filling means over a heating and a cooling zone, said moving gas-permeable walls being composed of endless belts, wherein the belts are composed of transverse gas-permeable strips alternating with transverse gas-impermeable strips of the same thickness.

3,888,609

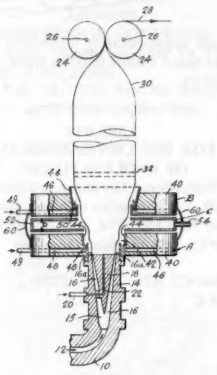
APPARATUS FOR PRODUCING FILMS IN ACCORDANCE WITH THE BLOWN TUBE PROCESS

Daniel R. Saint Eve, Thornhill, Ontario, and Ajit Kumar Bose, Don Mills, Ontario, both of Canada, assignors to Leco Industries Limited, St. Laurent, Quebec, Canada

Continuation-in-part of Ser. No. 79,754, Oct. 12, 1970, Pat. No. 3,754,067. This application May 11, 1973, Ser. No. 359,563
Int. Cl. B29c *25/00*; **B29f** *3/08*
U.S. Cl. 425—72 **12 Claims**

1. An apparatus for producing film by the blown tube process, wherein the apparatus includes at least one extruder and at least one extrusion die, the improvement comprising first and second cooling means, said first cooling means adapted to cool a molten tube of material extruded from said die, said first cooling means having a control chamber sized to receive said molten extruded tube for cooling same after extrusion from said die, said first cooling means being adapted to be mounted in operative downstream relationship to said die in the direction of movement of said film, said first cooling means adapted to cool said molten extruded tube to a temper-

ature above the crystallization formation temperature of the material but at a temperature at which said tube remains in a molten condition and sufficient to permit the formation of crystallites in the material, an annealing chamber located substantially midway between said first and second cooling means and located downstream from said first cooling means in the direction of movement of said film, said annealing chamber being sized to receive the film from the first cooling means while still in a molten condition, means for providing a vacuum operatively associated with said annealing chamber



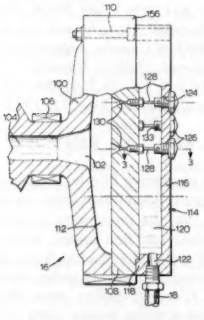
to withdraw sensible heat from said film and to permit expansion of same to the extent necessary to form crystallites therein, said second cooling means being in operative association with and located downstream from said annealing chamber in the direction of movement of said film, said second cooling means also having a chamber sized to receive said film from said annealing chamber for further cooling and solidifying the annealed molten film, to thereby produce an amorphous film having crystallites dispersed throughout said film and which is substantially free of crystal formation therein.

3,888,610

FORMATION OF POLYMERIC FIBRES

Warren A. Brackmann, Cooksville, and Daniel Diianni, Toronto, both of Ontario, Canada, assignors to Rothmans of Pall Mall Canada Limited, Toronto, Ontario M6A 2W4, Canada

Filed Aug. 24, 1973, Ser. No. 391,266
Int. Cl. D01d *3/00, 7/00*
U.S. Cl. 425—72 **13 Claims**



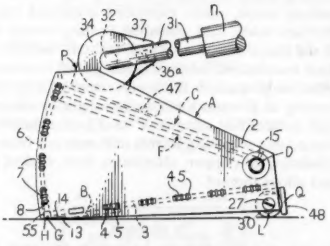
1. An extrusion head comprising:
a body,
an inlet orifice and passageway situated at one end of said body and adapted to communicate with a source of molten metal to be extruded,
a first hollow chamber formed in said body immediately adjacent and in fluid flow communication with said inlet orifice to receive the molten material therein,
a second hollow chamber in said body spaced from the inlet orifice a greater distance than said first hollow chamber,
a first plate separating said first and second hollow chambers and maintaining said second hollow chamber out of fluid flow communication with said first hollow chamber,
at least one inlet orifice communicating with said second hollow chamber, means to connect said at least one inlet orifice to a source of a heated gas under pressure,
a plurality of narrow conduits each in fluid flow communication with said first hollow chamber through an individual aperture in said first plate and freely extending through said second hollow chamber out of fluid flow communication with said second hollow chamber, said second hollow chamber being defined by a second plate spaced from said first plate and a skirt integral therewith extending towards and contacting said first plate,
said second plate having a plurality of outlet orifices therein, the number of said plurality of outlet orifices equalling the number of said plurality of narrow conduits each one of which extends through a different one of the plurality of outlet orifices, and
means in said outlet orifices adapted to allow hot gas under pressure to be projected at high velocity from said second hollow chamber substantially parallel to each individual narrow conduit.

3,888,611

RECESS FILLING MASTIC APPLICATOR HAVING FOUR POINT CONTACT WITH SURFACE AND NOVEL TOOLTEERING MEANS

Robert G. Ames, Hillsborough, Calif., assignor to Ulysses Stanley Ames, San Carlos, Calif.

Filed July 22, 1974, Ser. No. 490,769
Int. Cl. B29c *3/00;* **B28b** *3/00*
U.S. Cl. 425—87 **6 Claims**



1. A recess filling mastic applicator comprising:
a. a body for receiving mastic and having spaced apart side walls, an arcuate rear wall, and a bottom wall having a mastic outlet opening disposed adjacent to the rear arcuate wall;
b. a mastic pressing plate having its front edge pivotally connected to said side walls, the side edges of said plate being disposed adjacent to the side walls and the rear edge of said plate lying adjacent to said arcuate rear wall;
c. a handle pivotally connected to said pivoted plate;
d. a trowelling blade extending transversely across the lower edge of said arcuate trailing wall and having an arcuate

lower edge so that only the two ends of said blade will contact with the surface over which the tool is moved;

e. a pair of spaced apart wheels operatively connected to said side walls of the tool body, said wheels having rubber tires which contact with the surface;

f. the pivotal connection between the handle and said plate including means for urging the front of the tool body to the right or to the left when the operator exerts a lateral thrust on the handle toward the right or toward the left while pressing on the handle to maintain the tool body in a four point contact with the surface;

g. whereby a lateral thrust of the handle to the right will cause the tool body front to swing toward the right so as to warp the rubber tire portions to the left that contact with the surface and permit the tool body to steer to the right and vice versa when the lateral thrust is to the left.

3,888,612

INJECTION MOULDING MEANS FOR FORMING A COMPOSITE PRODUCT

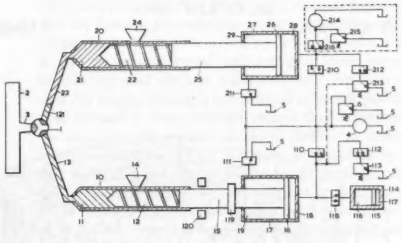
Klaus Schrewe, Leverkusen; Ullrich Knipp, Schildgen, and Akos Ravasz, Cologne, all of Germany, assignors to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 221,251, Jan. 27, 1972, Pat. No. 3,801,684. This application June 29, 1973, Ser. No. 374,943

Claims priority, application Germany, Jan. 28, 1971, 2103885

Int. Cl. B28b *13/02*

U.S. Cl. 425—130 **14 Claims**



1. Injection apparatus for an injection moulding machine comprising:

1. an injection unit for a first material and
2. an injection unit for a second material, each injection unit comprising:
   a. an injection ram reciprocatably mounted in
   b. an injection barrel and
   c. a feed channel connected to the injection barrel,

said feed channels being arranged to be in communication with each other and with a common sprue channel during injection of the materials from the injection barrels;

3. driving means for driving said injection rams to inject material in sequence from said first material and second material injection units;
4. control means to vary the position of the ram of the second material injection unit, during injection of the first material, whereby the interface between the first and second materials is caused to move up the second material feed channel towards the second material injection barrel and be maintained in said feed channel; and
5. limiting means to limit the flow of second material up the feed channel of the first material injection unit during injection of the second material.

3,888,613

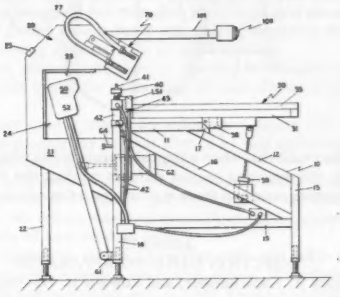
APPARATUS FOR POST FORMING LAMINATES

Bernard J. Fries, Jenison, and Lance E. McLander, Grand Rapids, both of Mich., assignors to Steelcase Inc., Grand Rapids, Mich.

Filed Aug. 8, 1973, Ser. No. 386,533

Int. Cl. B29c *17/02*

U.S. Cl. 425—160 **60 Claims**



1. An apparatus for post forming laminate tops comprising: table means for supporting a top substrate and its overhanging laminate; a heater of generally C-shaped cross section for embracing said overhanging laminate, said heater including an opening through which said laminate extends into said heater; a former of generally C-shaped cross section having a top plate, a back plate and a bottom plate; means for moving said former and said table relative to one another in a first motion, said first motion being a wiping movement of said former past the edge of said substrate whereby said former wipes said overhanging laminate over the top edge of said substrate; means moving said table and at least said back and bottom plates of said former relative to one another in a second motion, said second motion being a clamping motion of at least said bottom plate and said back plate said former towards the periphery of said substrate whereby said former forces said laminate around the bottom edge of said substrate; said former including an inside dimension corresponding generally to the thickness of the periphery of said substrate whereby when said bottom and back plates of said former are moved towards said periphery, said former forms said laminate around said periphery, embraces said periphery and clamps said laminate to said periphery of said substrate.

3,888,614

APPARATUS FOR PRODUCING A FOAMED RESIN SHEET IN A CURVED DIVERGING EXPANSION ZONE

William R. Foster, Wrexham; Durgacharan Sen, Cwmbran, and Stanley J. Skinner, Newport, all of Wales, assignors to Monsanto Chemicals Limited, London, England

Division of Ser. No. 192,465, Oct. 26, 1971, Pat. No. 3,810,965. This application Jan. 17, 1974, Ser. No. 434,170

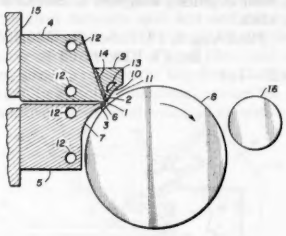
Claims priority, application United Kingdom, Nov. 3, 1970, 52268/70; Feb. 18, 1971, 4900/71

Int. Cl. B29d *27/00*

U.S. Cl. 425—224 **9 Claims**

1. An apparatus suitable for the extrusion of a sheet of foamed thermoplastic resin, comprising a slit die orifice communicating with an expansion zone defined by a pair of opposing curved surfaces that can be cooled, one of the surfaces being a convex surface that can move in a direction away from the slit die orifice and the other surface being concave, the curvatures and relative spacing of the opposing curved surfaces with respect to each other being such that the space between said curved surfaces is at a minimum at the beginning of said expansion zone proximate said slit die orifice and said

spacing progressively increases in a direction away from said slit die orifice to a maximum at the end of said expansion zone,



with the result that when a foamable resin is extruded through the die the opposing curved surfaces contact the expanding and foaming resin and there is produced a foamed resin sheet.

3,888,615

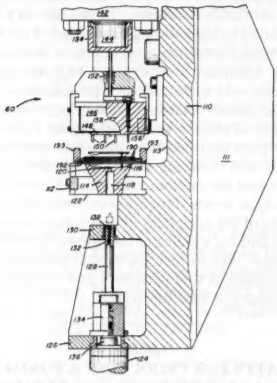
INJECTION MOLDING APPARATUS

Lawrence A. Ulmschneider, and Edward H. Dowling, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 323,606, Jan. 15, 1973, Pat. No. 3,833,329, which is a continuation of Ser. No. 86,668, Nov. 4, 1970, abandoned. This application Jan. 4, 1974, Ser. No. 430,834

Int. Cl. B29f *1/06*

U.S. Cl. 425—246 **6 Claims**



1. Continuous plastic injection molding apparatus comprising a plurality of mold assemblies each having a pair of separable mating die members, means arranged to selectively open and close said die members, means forming an injection chamber disposed in cooperating relationship with each pair of die members, said injection chamber opening through a sprue opening into the mold cavity formed between the die members and outwardly through the bottom surface of said injection chamber forming means, means for supplying molten plastic upwardly into said injection chambers through the opening in the bottom surface of the injection chamber, means for causing continuous relative movement between said mold assemblies and injection chambers and said molten plastic supply means about a vertical axis, said plastic being retained in said injection chamber after moving beyond said plastic supply means by frictional engagement of the plastic with the injection chamber, and ram means cooperating with each of said injection chambers arranged for upward movement into said injection chamber to force plastic therein into said mold cavity after said injection chamber and mold assembly have moved beyond said plastic supply means.

3. Continuous plastic injection molding apparatus comprising a plurality of mold assemblies each having a pair of separable mating die members, means arranged to selectively open and close said die members, means forming an injection chamber disposed in cooperating relationship with each pair of die members, said injection chamber opening through a sprue opening into the mold cavity formed between the die members and outwardly through an outer surface of said injection chamber forming means, means for supplying molten plastic to said injection chambers, means for causing continuous relative movement between said mold assemblies and injection chambers and said molten plastic supply means, and ram means cooperating with each of said injection chambers arranged to force plastic in said injection chamber into said mold cavity, said injection chamber being substantially unheated whereby excess plastic remaining therein after the mold cavity is filled is solidified at the same time as the material in said mold cavity, said ram means arranged to withdraw said solidified excess plastic from said injection chamber and to space said excess plastic from the outer surface of said injection chamber forming means.

3,888,616

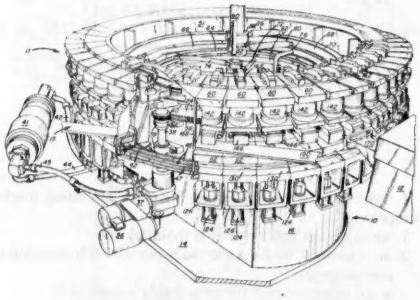
INJECTION MOLDING APPARATUS

Lawrence A. Ulmschneider, and Edward H. Dowling, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 323,606, Jan. 15, 1973, Pat. No. 3,833,329, which is a continuation of Ser. No. 86,668, Nov. 4, 1970, abandoned. This application Jan. 4, 1974, Ser. No. 430,839

Int. Cl. B29f *1/06*

U.S. Cl. 425—246 **3 Claims**

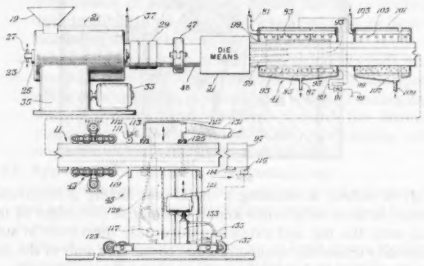


1. Thermoplastic injection molding apparatus comprising a pair of separable mating die members, means arranged to open and close said die members, a thermoplastic inlet opening communicating with the die cavity formed between said die members, means arranged to supply a molten thermoplastic material to said die members, and means for causing continuous unidirectional relative movement between said die members and said thermoplastic supply means, said supply means including a substantially horizontal thermoplastic extruder vertically and horizontally pivotally mounted at the end thereof remote from said die members, and means arranged to urge the outlet end of said extruder into contact with said inlet opening of said die members.

3,888,617
APPARATUS FOR FORMING MULTIPLE PASSAGEWAY CONDUIT

Louis H. Barnett, 3631 Encanto Dr., Fort Worth, Tex. 76109

Division of Ser. Nos. 149,910, June 4, 1971, abandoned, and Ser. No. 273,359, , Pat. No. 3,825,641. This application July 24, 1973, Ser. No. 382,142
Int. Cl. B29f *3/04*
U.S. Cl. 425—296 **7 Claims**



1. Apparatus for forming conduit means having exterior walls around a plurality of passageways extending longitudinally therewithin comprising:

a. blender and extruder means for effecting extrusion of said conduit as a single, continuous, hot extrudate, and having:

i. hopper means for receiving a raw feed comprising plastic;

ii. plasticizer means connected with said hopper means for converting said raw feed into a viscous molten mass and for forcing said viscous molten mass through a die means under high differential pressure thereacross; and

iii. die means connected with said plasticizer means for converting said molten mass into said hot extrudate; said die means having a plurality of adjacent pin means that include at least one pin means that is surrounded by adjacent pin means so as to define at least one interior passageway that is totally surrounded by interior walls that cannot be cooled by an external coolant and that, consequently, are subject to sagging; said plurality of adjacent pin means being spaced apart so as to define a continuous extrusion passageway around each said pin means so as to form said hot extrudate into said conduit that is continuous and closed in cross section and that defines said plurality of longitudinally extending passageways, each passageway having at least a portion of its internal walls in common with an adjacent passageway, said pin means being elongated and having parallel and connected cooling passageways disposed interiorly therewithin and extending longitudinally therealong for flowing a cooling fluid into and out of said pin means for cooling and supporting walls of said hot extrudate to prevent intolerable sagging, said pin means also having a second cooling passageway extending longitudinally therethrough for passage of cooling and pressurizing fluid into said longitudinally extending passageways of said hot extrudate for supporting walls thereof to prevent sagging;

b. cooling, sizing and vacuum chamber means for cooling said hot extrudate while simultaneously effecting a reduced pressure on the exterior thereof; said cooling, sizing and vacuum chamber means including:

i. cooling fluid aperture means for admitting a cooling fluid into said cooling, sizing and vacuum chamber means onto the exterior of said hot extrudate;

ii. vacuum producing means for exhausting said cooling fluid and effecting a predetermined reduced pressure within said cooling, sizing and vacuum chamber means that is less than the pressure within said hot extrudate, whereby the walls of said hot extrudate are urged outwardly in operation; and

iii. support means for sizing and preventing distortion of the pliable walls of said hot extrudate under the force of gravity and the differential pressure from the interior to the exterior thereof until the extrudate is cooled to a non-pliable state so as to resist and distortion;

c. pulling means disposed downstream of and lineally along the longitudinal axis of said cooling, sizing and vacuum chamber means and when operational of said extrudate, for moving said hot extrudate away from said die means, said pulling means being adapted for engaging the self-supporting exterior walls of said extrudate;

d. track means comprising a plurality of lineally aligned support means for supporting the non-pliable extrudate; and

e. square cutting means for effecting a square cut of the multi-passageway conduit formed by said extrudate; said square cutting means including:

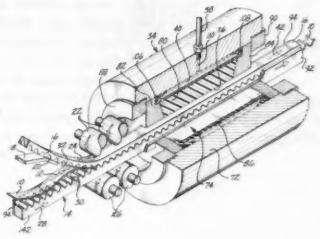
i. a table means that is reciprocally moveable longitudinally of said conduit and carrying a cutting blade and power means that is reciprocally movable perpendicularly of said conduit; and

ii. attachment means connected with said table means and with a length measuring means and adapted to releasably connect said conduit means and said movable table means for temporarily effecting concomitant movement thereof.

3,888,618
APPARATUS FOR DIE FORMING STRIP MATERIAL

Everett E. Jones, Wichita, Kans., assignor to The Boeing Company, Seattle, Wash.

Filed Apr. 18, 1974, Ser. No. 461,995
Int. Cl. B29c *17/02*
U.S. Cl. 425—389 **4 Claims**



1. Apparatus for die forming elongate strips composed of material capable of undergoing plastic deformation comprising:

an elongate, substantially rigid die half having a die face of predetermined configuration,

an elongate, flexible die half having a die face of a configuration complementary to the die face of said rigid die half, said die faces capable of mating interrelationship over at least a predetermined length of said die halves, said predetermined length being less than the elongate dimension of said die halves,

pressure means for exerting a force on said rigid die half and an opposing force on said flexible die half when said die halves are in mating interrelationsip, said forces being uniformly distributed over said predetermined length of said rigid and flexible die halves, said force on each of said die halves being directed toward the die face on the opposing die half, said forces being sufficient to cause a strip of material between said die halves to undergo plastic deformation,

first means for feeding said rigid die half along a substantially straight path into said pressure means,

second means for feeding said flexible die half from a first location spaced from said rigid die half and upstream from said pressure means into registration with said rigid die half at a second location upstream from said pressure means and for feeding said flexible die half along a substantially straight path conjunctively with said rigid die half from said second location to said pressure means.

3,888,619

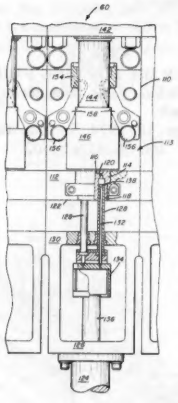
INJECTION MOLDING APPARATUS

Lawrence A. Ulmschneider, and Edward H. Dowling, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 323,606, Jan. 15, 1973, Pat. No. 3,833,329, which is a continuation of Ser. No. 86,668, Nov. 4, 1970, abandoned. This application Jan. 4, 1974, Ser. No. 430,833

Int. Cl. B29 *1/06*

U.S. Cl. 425—436 R **9 Claims**



1. Injection molding apparatus comprising a pair of separable mating die members arranged for substantially continuous motion in a closed path, means arranged at a first location to inject a molten plastic material into the mold cavity between the closed die members to form a plastic part, means arranged at a second location to open said die members after said plastic part has solidified, conveyor means arranged to enter between said opened die members at a third location between said second and said first locations, said conveyor means having a part-receiving portion which has a velocity substantially equal to that of the die members at said third location, means to eject said solidified plastic part from said die onto said conveyor means whereby said plastic part is maintained in a predetermined orientation, and means mounting said conveyor means for pivotal movement out of said path in response to said die members failing to open.

9. The invention according to claim **8** wherein said excess plastic removing means includes an ejection pin extending substantially coaxially through the injection means and operable after said injection means is withdrawn from said injection chamber.

3,888,620

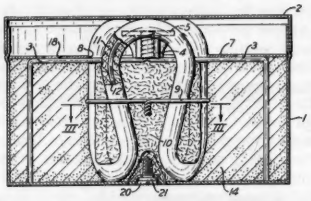
SOLID FUEL EMERGENCY BURNER FOR LIGHT AND HEAT

Harry J. Devon, Pittsburgh, Pa., assignor to Frederick E. Schuckman, Pittsburgh, Pa., a part interest

Filed May 1, 1974, Ser. No. 466,008

Int. Cl. F23d *3/16*

U.S. Cl. 431—291 **8 Claims**



1. A burner comprising a metal can having a removable cover, at least three wires joined together at the center of the can near the top and extending outwardly therefrom in substantially uniformly spaced relation to the side wall of the can where they are integrally connected to the upper ends of vertical portions extending downwardly to the bottom of the can, a metal plate resting on said wires and provided with a central opening, a metal heat conductor mounted on the wires at the junction thereof and extending up through said plate opening, wick means extending from the bottom of the can up through said plate opening beside said heat conductor, and a body of wax beneath said plate and filling the can around said wick means, whereby when the burner is burning, said wires will conduct heat from said heat conductor down into the wax to help melt it.

3,888,621

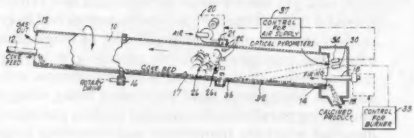
MONITORING AND CONTROLLING KILN OPERATION IN CALCINATION OF COKE

Merlyn Morris Williams, Kitimat, British Columbia, Canada, assignor to Alcan Research and Development Limited, Montreal, Canada

Filed Apr. 12, 1974, Ser. No. 460,463

Int. Cl. F27b *7/20*

U.S. Cl. 432—19 **13 Claims**



1. In a method of calcining coke wherein the coke is advanced from feed end to discharge end in a rotary kiln countercurrent to gas flow and wherein by causing heat to traverse the kiln, combustible volatiles are removed from the traveling coke and are caused to burn continuously in an intermediate region of the kiln and thereby to produce heat used in continuing removal of volatiles, said burning creating a condition of flame and/or smoke constituting a combustion disturbance across the kiln that is observable from the discharge end, and the place of said burning being indicated by the place of said observable disturbance and being movable, with accompaniment by corresponding movement of said observable disturbance, lengthwise of the kiln in accordance with operating conditions:

the procedure of monitoring kiln operation by optical pyrometer inspection of the interior of the kiln from the discharge end, such inspection of said combustion disturbance yielding a distinctive instability of temperature

signals that is detectable as such but is meaningless as a reading of kiln temperature; said procedure comprising

a. effecting said inspection of a first kiln locality downstream in the coke path from a desired place for said combustion disturbance, to obtain temperature signals significant to the effectiveness of the calcining operation,

b. effecting said inspection of a second kiln locality spaced upstream in said path from the first locality but also downstream of said desired place, to determine, by appearance of temperature signals having or lacking said instability, whether said disturbance is or is not occurring at said second locality, and

c. when said inspection of said second locality indicates occurrence of said disturbance, adjusting the kiln operation as to condition, to cause said volatile burning and disturbance to move upstream toward the desired place, away from the second locality, for keeping said disturbance away from said first locality.

12. Apparatus for calcining coke comprising

a. a rotary kiln having a coke feed end and a coke discharge end and arranged for travel of gases countercurrent to the travel of coke,

b. adjustable means for supplying air at least at one locality intermediate the ends of the kiln, for use in burning volatiles removed from the coke, the place of said burning being observable by combustion disturbance of said burning,

c. optical pyrometer means for inspecting the interior of the kiln from the discharge end at a plurality of localities to yield temperature signals, said pyrometer means yielding a distinctive instability of temperature signals when inspecting a locality at or upstream of such combustion disturbance, said pyrometer means comprising

d. first means for inspecting the kiln interior at a first locality closer to the discharge end than the feed end, to produce temperature signals indicative of the effectiveness of calcining, and

e. second means for inspecting the kiln interior at a second locality upstream of the first locality, to produce temperature signals indicative of presence or absence of combustion disturbance at said locality, and

f. means controlled by said pyrometer means and responsive to such distinctive instability of temperature signals from the second means, for adjusting the air supply means to increase the air supplied thereby for causing the burning of volatiles to be displaced upstream of said second locality.

3,888,622

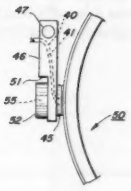
TEMPERATURE SENSING DEVICE

Raghulinga R. Thettu, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 15, 1973, Ser. No. 388,676

Int. Cl. F27b 9/24

U.S. Cl. 432—36 **4 Claims**



1. A fuser control device for regulating the surface temperature of a heated fuser roll including

means to heat the fuser roll,

a temperature sensing probe positioned in close noncontiguous relation with the fuser roll surface whereby an air gap is formed therebetween,

magnetic means being arranged to establish a force field within said air gap,

a magnetic fluid located in said air gap and supported within the force field, said fluid having a relatively high coefficient of conductivity whereby heat energy at the roll surface is rapidly and efficiently transferred to said temperature sensing probe,

control means responsive to said temperature sensing probe being operatively connected to said means to heat said fuser roll for maintaining said fuser roll surface temperature at a predetermined level,

wherein the magnetic fluid has a lower surface energy than the surface energy of said fuser roll and wherein the size of the air gap is greater than the size of the magnetic fluid particles.

CHEMICAL

3,888,623
TRANSFER MATERIALS
William Clarke; Timothy Leslie Dawson, and Douglas Alan Nichols, all of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England
Filed Nov. 28, 1973, Ser. No. 419,880
Claims priority, application United Kingdom, Dec. 8, 1972, 56675/72
Int. Cl. B41c *1/06;* **B41m** *5/00;* **D06p** *5/14*
U.S. Cl. 8—2.5 **6 Claims**

1. A transfer material which comprises a substrate which has been printed with at least one ink which contains two or more sublimable disperse dyestuffs which give a similar shade but having differing degrees of volatility.

3,888,624
PROCESS FOR DYEING WATER SWELLABLE CELLULOSIC MATERIALS WITH POLYPROPYLENE GLYCOLS
John Blackwell, Kennett Square, Pa.; William H. Gumprecht, Penns Grove, N.J., and Roy Emerson Starn, Jr., West Chester, Pa., assignors to E. I. du Pont de Nemours & Company, Wilmington, Del.
Continuation of Ser. No. 122,227, March 8, 1971, Pat. No. 3,706,525, which is a continuation-in-part of Ser. No. 778,809, Nov. 25, 1968, abandoned. This application Aug. 29, 1972, Ser. No. 284,477The portion of the term of this patent subsequent to Dec. 19, 1989, has been disclaimed.
Int. Cl. D06p *3/82*
U.S. Cl. 8—21 C **42 Claims**

1. The process for dyeing water swellable cellulosic materials which increase in size and flexibility upon exposure to water, at high utilization of dye, with a colored, preformed, high molecular weight disperse dye which has limited water solubility and does not require oxidation, reduction, hydrolysis or other chemical modification for fixation or development of color, which process comprises:

A. contacting the water swellable cellulosic material in any sequence, including simultaneously, at a temperature of 0°–225°C., with:
  1. water in an amount sufficient to swell the cellulosic material;
  2. a colored, preformed, high molecular weight disperse dye in an amount sufficient to color the cellulosic material, a boiling saturated solution of which dye in 0.1 Molar aqueous sodium carbonate exhibits an optical absorbance of 0–2 as calculated from the spectrophotometrically-determined optical absorbance of the solution obtained by diluting the saturated solution tenfold with a 90/10 mixture, by volume, of triethylene glycol dimethyl ether and water and then cooling to room temperature; and
  3. a solvent in an amount sufficient to maintain swelling of the cellulose if water is removed, and which
     a. is at least 2.5 weight % soluble in water at 25°C.,
     b. boils above about 150°C. at atmospheric pressure,
     c. is a solvent for the dye at some temperature in the range of about 0° to 225°C.,
     d. has the formula

$$R(O\text{-}\underset{\displaystyle CH_3}{CH}\text{-}CH_2)_m OH$$

     wherein R is H or $C_{1\text{-}8}$ alkyl and m is a positive whole number in the range 2–25 ; and
     e. has a molecular weight of less than 300; provided, however, that if the cellulosic material is contacted simultaneously with water and solvent, the water is 10 to 95 weight % and the solvent is 5 to 90 weight % of the combined water-solvent weights;

B. while maintaining the cellulosic material from (A) in its swollen state, contacting same throughout with a solution of the preformed dye in solvent or solvent-water;

C. fixing said preformed dye throughout the cellulosic material by precipitating same; and

D. recovering uniformly dyed cellulosic material which is fast to aqueous washing and organic solvent drycleaning.

3,888,625
METHOD OF CHROME-RETANNING LEATHER
William Orval Dawson, Milwaukee, Wis., assignor to Chemtan Company, Exeter, N.H.
Filed Jan. 29, 1973, Ser. No. 327,574
Int. Cl. C14c *3/06*
U.S. Cl. 8—94.27 **27 Claims**

1. In the process of chrome-retanning leather, the improvement which comprises contacting a leather to be chrome-retanned with basic chromium sulfate and a sulfite salt in an aqueous environment and thereafter contacting the leather with an aldehyde to deposit chrome as Cr_2O_3 in the leather and form a leather having over 6 percent by weight of Cr_2O_3 based on the dry weight of the leather.

3,888,626
USE AS CORROSION INHIBITORS: PHENANTHRIDINE PHOSPHONIC COMPOUNDS
Derek Redmore, Ballwin, Mo., assignor to Petrolite Corporation, St. Louis, Mo.
Continuation-in-part of Ser. No. 173,296, Aug. 19, 1971, Pat. No. 3,755,057, which is a division of Ser. No. 801,856, Feb. 24, 1969, Pat. No. 3,673,196. This application Aug. 10, 1973, Ser. No. 387,290
Int. Cl. C23f *11/16, 11/00, 11/04*
U.S. Cl. 21—2.5 A **7 Claims**

1. A process of inhibiting corrosion of ferrous metals by corrosive media which comprises contacting said metal with a full nitrogen heterocyclic phosphonic compound or mixtures of full nitrogen heterocyclic phosphonic compounds wherein the nitrogen heterocyclic group is a phenanthridine group having an unsaturated bond between the nitrogen atom and one adjacent carbon atom and a saturated bond between the nitrogen atom and the other adjacent carbon atom and the phosphorus atom of the phosphonic group is bonded directly to a carbon atom of said phenanthridine group and said phosphonic group is ortho to the nitrogen atom on said phenanthridine group or on an adjacent ring.

3,888,627

USE AS CORROSION INHIBITORS: QUINOLINE AND ISOQUINOLINE PHOSPHONATES

Derek Redmore, Ballwin, Mo., assignor to Petrolite Corporation, St. Louis, Mo.

Continuation-in-part of Ser. No. 173,296, Aug. 19, 1971, Pat. No. 3,775,057, which is a division of Ser. No. 801,856, Feb. 24, 1969, Pat. No. 3,673,196. This application Aug. 10, 1973, Ser. No. 387,535

Int. Cl. C23f *11/16, 11/04*

U.S. Cl. 21—2.5 A **7 Claims**

1. A process of inhibiting corrosion which is characterized by treating a metal with a composition comprising full nitrogen heterocyclic phosphonates and mixtures thereof and phosphonic acid derivatives thereof wherein the nitrogen heterocyclic group is a quinoline group or an isoquinoline group having an unsaturated bond between the nitrogen atom and one adjacent carbon atom and a saturated bond between the nitrogen atom and the other adjacent carbon atom and the phosphorus atom of a phosphonate group is bonded directly to a carbon atom of a quinoline group and a phosphonate group is ortho or para to the nitrogen atom in a quinoline group and ortho to the nitrogen group in an isoquinoline group.

3,888,628

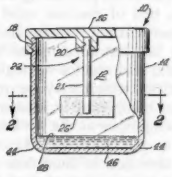
ANALYTICAL METHOD AND APPARATUS

J. Wallace Graham, 1501 N. Bundy Dr., Los Angeles, Calif. 90049

Filed Aug. 3, 1972, Ser. No. 277,775

Int. Cl. G01n *31/22, 33/16*

U.S. Cl. 23—230 B **13 Claims**



1. An analytical method comprising:

expanding the surface area of a liquid sample;

confining the resultant expanded sample within a closed chamber, said closed chamber also containing a vapor phase space and a liquid indicating reagent, said expanded sample being positioned in close proximity to and out of contact with said liquid indicating reagent;

allowing any volatile substance present with said expanded sample to vaporize to about room temperature into said vapor phase space and to react with said liquid indicating reagent; and

observing said liquid indicating reagent for a predetermined period of time to detect any indication of a reaction with said volatile substance.

3,888,629

PERFORMANCE OF CHEMICAL OR BIOLOGICAL REACTIONS WITHIN AN ABSORBENT MATRIX PAD

Kenneth Dawson Bagshawe, 115 George St., Marble Arch, London, W.1, England

Filed Sept. 8, 1972, Ser. No. 287,344

Claims priority, application United Kingdom, Sept. 8, 1971, 41972/71

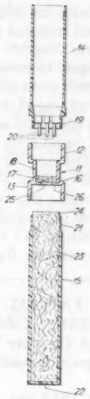
Int. Cl. G01n *33/16, 31/06*

U.S. Cl. 23—230 B **25 Claims**

1. A reaction cell of the type suitable for use in a radioimmunassay reaction in which a liquid reactant is employed and a particulate reaction product results, said cell comprising:

a container;

matrix-pad means in said container for holding all of the liquid necessary to enable said reaction and retaining said particulate reaction product while permitting passage therethrough of other reaction components, said matrix



pad means comprising a matrix pad of porous absorptive material which is chemically inactive with respect to said reaction; and

support means in said container for supporting said matrix pad means such that liquid may pass through said matrix pad means from one side thereof to the other.

3,888,630

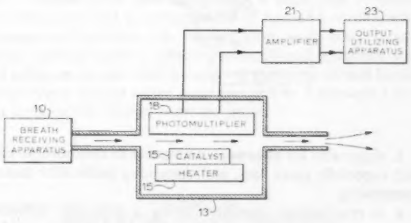
BREATH TESTING METHOD

Donald F. Hoeg, Mt. Prospect, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Dec. 26, 1973, Ser. No. 428,159

Int. Cl. G01n *33/16, 27/68*

U.S. Cl. 23—232 E **1 Claim**



1. A method for determining breath alcohol concentration comprising the steps of:

providing a sample of breath received from a person to be tested;

establishing a combusting zone;

flowing said breath sample through said combusting zone to oxidize any alcohol present in said sample, thereby producing oxyluminescence in an amount proportional to the alcohol concentration;

and developing, in response to the oxyluminescence, an electrical information signal indicative of the alcohol level in said breath sample.

3,888,631
TEMPERATURE INDICATOR

Oskar Edwin Stürzinger, Kirchmattweg 6, Baar, Switzerland

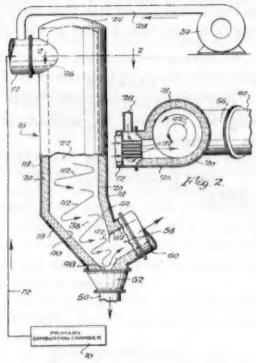
Filed Apr. 8, 1974, Ser. No. 458,822
Claims priority, application Switzerland, Apr. 12, 1973, 5288/72
Int. Cl. G01k *1/02, 3/00, 11/00;* **G01n** *21/06*
U.S. Cl. 23—253 TP **3 Claims**

1. A temperature indicator for deep frozen products comprising a paper-like fibrous material containing a binder and two water soluble colorless reagents which react chemically when both reagents are liquid to produce a dye which imbues the fibers with a color which contrasts with the basic color of the fibrous material, at least one of the reagents being present in the form of a microencapsulated aqueous solution thereof, the solution being in the liquid state at a temperature below 0°C. and having a predetermined sub-zero freezing point, the microcapsules adapted to burst at a temperature of 4°C. to 0°C. as a result of the volume expansion of the water in the aqueous solution and permit the reagents to react to produce the dye until the temperature has been lowered to a point where at least one of the reagents freeze.

3,888,632
COMBUSTION CHAMBER

Jack J. Fritz, Buffalo, and Theodore W. Lucas, Jr., Williamsville, both of N.Y., assignors to Andco Incorporated, Buffalo, N.Y.

Filed Dec. 14, 1973, Ser. No. 424,812
Int. Cl. F23c *9/04;* **F23g** *7/06*
U.S. Cl. 23—277 C **10 Claims**



1. Apparatus for effecting combustion of combustible material, especially gases, tars, and suspended particulate material comprising:

a. a combustion chamber having a generally cylindrical upper portion wherein combustion of said material occurs and a lower portion for receiving liquid and solid products of the combustion;

b. means for introducing the material to be burned into said chamber for flow therealong during combustion;

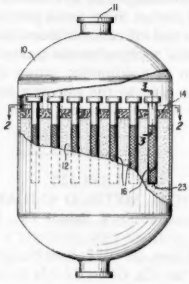
c. first outlet means in said lower portion adjacent the bottom thereof for removing the liquid and solid products of combustion, said first outlet means being offset from the longitudinal axis of said upper portion; and

d. second outlet means in said lower portion adjacent said first outlet means for removing waste gas from the combustion, said second outlet means being located to cause the waste gas to travel along the entire length of said lower portion, whereby said waste gas supplies heat to maintain said liquid and solid products in a flowable state in said lower portion of said combustion chamber to facilitate removal of said liquid and solid products through said first outlet means.

3,888,633
CHEMICAL REACTOR HAVING MEANS FOR REMOVING IMPURITIES FROM A FLUID STREAM

Martin P. Grosboll, Homewood, and Robert R. Edison, Olympia Fields, both of Ill., assignors to Atlantic Richfield Company, Philadephia, Pa.

Filed May 24, 1973, Ser. No. 363,703
Int. Cl. B01j *9/00, 4/00;* **B01d** *23/20*
U.S. Cl. 23—284 **8 Claims**



1. A chemical reactor for processing a fluid stream comprising a chamber, a bed of discrete solid particles contained within said chamber, entrance means and exit means for said fluid stream with said entrance means being located above said exit means and said reactor having means for removing particulate impurities which may be present in said fluid stream, said means comprising at least one hollow elongated basket member being open at the upstream end thereof, and being adapted to be generally aligned along the principal axis thereof with the direction of fluid flow and to be extended along a substantial portion of the length thereof into said bed of solid particles, said basket member being defined by impervious upstream and pervious downstream sidewalls and a pervious downstream endwall, the pervious downstream endwall and pervious downstream sidewall adjacent said pervious downstream endwall being of open mesh construction, said impervious upstream sidewall being of length sufficient to extend below the surface of said bed and said open upstream end of said basket member containing flow restricting means arranged and constructed so as to provide said open upstream end with a cross-sectional flow path area which is substantially less than the cross-sectional flow path area defined by said impervious upstream sidewall.

3,888,634
PROCESS FOR PREPARATION OF A FILM OF LEAD MONOXIDE

Masanari Shindo, Tokyo, Japan, assignor to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

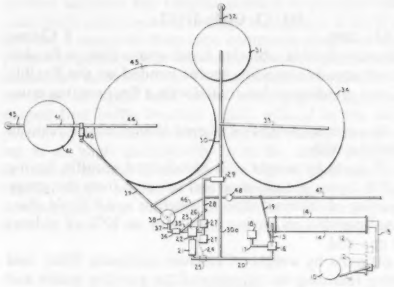
Filed Mar. 23, 1973, Ser. No. 344,221
Claims priority, application Japan, Mar. 27, 1972, 47-29757
Int. Cl. C01f *7/34;* **C22b** *13/00*
U.S. Cl. 23—305 **11 Claims**

1. A process for the production of a lead monoxide film comprising heating a starting material containing lead monoxide in the presence of silicon dioxide in an evaporation zone to a sufficient temperature to cause evaporation of said lead monoxide, and depositing said evaporated lead monoxide on a substrate located outside said zone.

3,888,635
AGGLOMERATING SODIUM SULFATE

William W. Coghill, and William J. Rotramel, both of Tulsa, Okla., assignors to Ozark-Mahoning Company, Tulsa, Okla.

Filed Sept. 26, 1973, Ser. No. 400,800
Int. Cl. B01j 2/12; C01d 5/00
U.S. Cl. 23—313 13 Claims



1. A process of producing agglomerated particles of sodium sulfate of relatively low density in a desired size range comprising the steps of:

continuously passing quantities of relatively dense minus 100 mesh sodium sulfate fines into a mixing and mulling step with the addition thereto of 10 to 16 percent by weight of water,

continuously passing the mixed and mulled, wetted fines from the latter step to a simultaneous agglomerating and drying step,

agglomerating in said latter step balls or chunks of less dense sodium sulfate in a size range of +10 mesh to −100 mesh and simultaneously drying the water from same,

the agglomerating and drying step carried out in a single inclined rotary dryer without flights at the upper end thereof with the feed of mixed and mulled wetted fines thereto being at said upper end,

thereafter passing the completely dried, agglomerated sodium sulfate balls from said drying and agglomerating step to a size separating step, and,

separating oversize and undersize material from the desired product in said size separating step.

3,888,636
HIGH DENSITY, HIGH DUCTILITY, HIGH STRENGTH TUNGSTEN-NICKEL-IRON ALLOY & PROCESS OF MAKING THEREFOR

Francis E. Sczerzenie, and Frank I. Zaleski, both of Philadelphia, Pa., assignors to Government of the United States as represented by the Secretary of the Army, Washington, D.C.

Continuation of Ser. No. 111,757, Feb. 1, 1971, abandoned. This application Nov. 10, 1972, Ser. No. 305,640
Int. Cl. B22f 5/00; F42b 13/04
U.S. Cl. 29—182 2 Claims

1. A preformed penetrator for armor-piercing projectiles comprising an as-sintered alloy having at room temperature, a nominal dendity of 18.5 g/cc, a yield strength (.2% offset) of 100 ksi, an ultimate tensile strength of 137 ksi, an elongation in 1 inch of 11%, said alloy produced by the steps of

blending fine powders of tungsten, nickel and iron with a minor proportion of an atomized synthetic wax to form a blended mix,

pressing said blended mix to a density of at least 11.6 g/cc to form a green compact,

sintering said green compact for densification thereof, and cooling said densified sintered piece to form a finished piece devoid of voids and a matrix phase of nickel and iron totally homogeneous, said cooling being further characterized by the steps of

slow-cooling said sintered piece to a temperature of about 1,300°–1,400°C at a rate of about 15°C/minute, and

quenching said slow-cooled piece to below about room temperature in a reducing atmosphere chamber, said alloy consisting of, by weight,

about 97% tungsten,

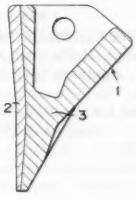
about 1.5% nickel, and

about 1.5% iron.

3,888,637
RIPPER POINT PART

Kazuo Taguchi, Urawa, and Tadashi Satake, Isehara, both of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Japan

Filed Dec. 29, 1972, Ser. No. 319,670
Int. Cl. B32b 15/18
U.S. Cl. 29—191 9 Claims



1. A ripper point part comprising a main part of softer, low-alloy steel and a surface layer of harder low-alloy steel arranged at the front side of said main part, wherein said harder surface layer is adhesively combined integrally with said softer main part and the ratio of thickness of said harder surface layer to said softer main part is 1 to 5 through 1 to 9 at a location 40–50 mm from the point.

3,888,638
INSULATING WEDGE INSERTION

Robert G. Walker, Ossian, Ind., assignor to Industra Products, Inc., Fort Wayne, Ind.

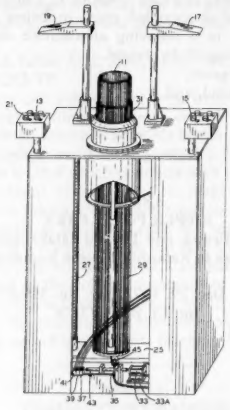
Filed Feb. 28, 1974, Ser. No. 446,721
Int. Cl. H02k 15/10
U.S. Cl. 29—205 E 11 Claims

1. In a device for placing insulating wedges into slots of a magnetic core by linearly moving wedge push rods into a wedge containing magazine to force wedges axially from the magazine into core slots, a mechanism for accommodating the device to insert various length wedges comprising:

a carriage reciprocably movable in the direction of wedge insertion;

means coupling the carriage to the wedge push rods for

moving the wedge push rods including means for varying the distance between the carriage and certain of the



wedge push rods to thereby vary the distance that the certain wedge push rods force corresponding wedges.

3,888,639

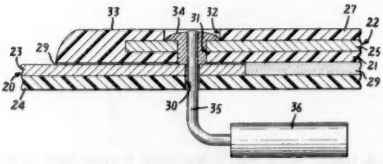
METHOD FOR CONNECTING PRINTED CIRCUITS

Myron L. Hastings, Hollis, and Joseph P. Roberts, Hudson, both of N.H., assignors to Teledyne Electro-Mechanisms, Nashua, N.H.

Filed Jan. 2, 1974, Ser. No. 429,917

Int. Cl. H05k *3/34*

U.S. Cl. 29—626 **8 Claims**



1. The method of connecting at least a first and second printed electrical circuit, each having at least one conductor plane in the form of a printed circuit configuration and one supporting substrate for the conductor plane, comprising the steps of:

creating at least a first hole in said first printed circuit at a location where a connection to at least one of the conductor planes is desired, said first hole passing only through to the conductor plane of said first printed circuit;

creating at least a second hole substantially concentric with said first hole, said second hole being slightly smaller than said first hole and passing completely through said first printed circuit;

applying an adhesive to at least one of said printed circuits; registering the other printed circuit with respect to the one;

bringing the other printed circuit into contact with the adhesive;

creating at least a third hole, substantially concentric with and smaller than the second hole, through said second printed circuit; and

applying molten solder to the side of said first printed circuit having the first hole in it, thereby mechanically securing said printed circuits together and electrically connecting their conductor planes to each other.

3,888,640

COATING FOR FLEXIBLE ABRASIVE BANDS

Günter Bigorajski, Gehrden, and Joachim Ellerkamp, Langenhagen, both of Germany, assignors to Vereinigte Schmirgel- und Maschinenfabriken AG, Germany

Division of Ser. No. 98,964, Dec. 16, 1970, abandoned. This application Jan. 22, 1973, Ser. No. 325,866

Claims priority, application Germany, Jan. 15, 1970, 2001612

Int. Cl. C08g *51/12*

U.S. Cl. 51—298 **5 Claims**

1. A coated flexible abrasive band comprising a flexible support and abrasive grinding grains bonded on the flexible support, said grinding grains coated with a final coating comprising

a. 25–30 parts by weight of phenol-formaldehyde resin in admixture with;

b. 10–25 parts by weight of a chlorinated paraffin having 50–70% by weight chlorine and selected from the group consisting of chlorinated solid paraffins and a liquid chlorinated paraffin oil having a viscosity at 20°C of at least 500 cp., and,

c. 50–60 parts by weight of calcium carbonate filler, said coating retarding the blunting of the grinding grains and improving the grinding efficiency and life of the band.

3,888,641

METHOD OF ERASING SMOKE

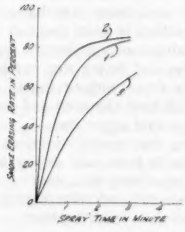
Shoji Ito, Tokyo, Japan, assignor to Nittan Limited Company, Tokyo, Japan

Filed July 17, 1973, Ser. No. 380,086

Claims priority, application Japan, July 24, 1972, 47-73470

Int. Cl. B01d *47/06*

U.S. Cl. 55—84 **1 Claim**



1. In the method of removing smoke in a building wherein smoke is produced by fire forming a smoke filled area, the improvement comprising the steps of forming a aqueous solution containing up to about 1% of a surfactant wherein said surfactant constitutes at least one substance selected from the group consisting of dialkyl sulfosuccinates, alkyl suflates, alkyl benzenesulfonates, recinolic ester sulfates, alkyl esters of α-sulfofatty acid, monosodium α-phosphonofatty acid esters, dialkyl phosphates, polyoxyethylenealkyl sulfates, polyethylenealkyl phenols, polyoxyethylenealkyl ethers and tripolyoxyethylenealkyl phosphates and then spraying said solution into the smoke filled area to settle the smoke particles.

3,888,642

STEAM DUST SCRUBBER ATTACHMENT FOR EXHAUST STACK

James Toyama, 1980 Cedar Ave., Long Beach, Calif. 90806

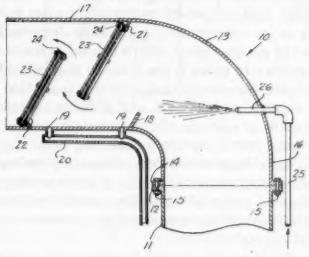
Filed Nov. 28, 1972, Ser. No. 310,103

Int. Cl. B01d *50/00*

U.S. Cl. 55—263 **1 Claim**

1. In an exhaust gas steam scrubbing system in combination with a stack for conducting pollutant containing exhaust gases, said stack being provided with an annular flange on the upper end thereof, a tubular elbow including a vertically

disposed portion and a horizontally disposed portion that are arranged substantially at right angles with respect to each other, said elbow having an annular flange detachably secured to the flange on said stack, the vertical portion of said elbow leading upwardly from its flange, the horizontal portion of said elbow having its axis generally perpendicular to the axis of the vertical portion, a single solid baffle arranged to extend in an upwardly inclined relation from the base of the horizontal portion adjacent the vertical portion, a plurality of spaced apart drain ports opening through the bottom of the horizontal portion, a manifold drain pipe communicating with said drain ports and projecting downwardly therefrom, said baffle being positioned upsteam from the drain ports in order to prevent the flow of liquid back down in the stack, a generally U-shaped first baffle bracket rigidly affixed in the horizontal portion of the elbow downsteam from the baffle and projecting at an angle downwardly from the upper portion of the horizontal portion of the elbow, a second generally U-shaped bracket rigidly affixed in the horizontal portion of the elbow downstream from the first bracket and projecting upwardly from the base of the horizontal portion and positioned parallel



and spaced from the first bracket, a filter baffle positioned in a frame and secured to each of said brackets, said filter baffles being arranged in spaced parallel relation with respect to each other and extending towards the opposite portion but spaced therefrom, a steam pipe extending from a source of steam under pressure, a steam jet nozzle operatively connected to said steam pipe and said steam jet nozzle being positioned at the juncture of the vertical portion and the horizontal portion of the elbow, and said steam jet nozzle being positioned with its axis parallel to the axis of the horizontal portion of the elbow and arranged above the upper edge of the solid baffle, and whereby steam is mingled with the exhaust gases by passage through the steam pipe and the steam nozzle and the mingled exhaust gases and steam pass through the spaces over the solid baffle beyond the filter baffles, and wherein the mingled gases on passing over the solid baffle and around the filter baffles change direction whereby some condensation of the steam takes place so that the condensing of the steam forms water droplets which entrain a portion at least of the solid materials in the gas, the water droplets with entrained solids flowing downwardly to the drain ports and out through the manifold pipe.

3,888,643

ELECTRIC VACUUM CLEANER AND STOOL

Hiromi Yoshikawa; Katsuo Sawada; Shigeyuki Asanari; Saburo Kajikawa, and Takao Kodama, all of Yokaichi, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

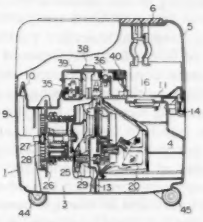
Filed Sept. 10, 1973, Ser. No. 395,436

Claims priority, application Japan, Sept. 12, 1972, 47-92078

Int. Cl. B01d *46/04*

U.S. Cl. 55—274 **10 Claims**

1. An electric vacuum cleaner and stool including a cleaner body comprising a generally box-like enclosure having a top wall, a bottom wall and side walls; an electrically operated fan and means stowing an electric cord both disposed within said enclosure adjacent one of said side walls and arranged in juxtaposed relationship; means stowing a flexible hose on said top of said enclosure; a first opening in a second side wall of said enclosure opposite said one side wall; a dust collector means including a generally box-shaped casing slidably movable through said first opening into and out of the interior of said enclosure, a handle on an outer wall of said dust collector casing, a second opening in the top of said dust collector casing, a third opening in a second wall of said dust collector casing opposite the wall on which said handle is provided; a filter assembly detachably mounted on said dust collector casing adjacent said third opening and being movable with said casing; means for sealingly coupling said filter assembly with said electrically operated fan when said dust collector



casing is fully moved into said enclosure; an air inlet formed in said top of said enclosure and positioned such that said air inlet is in registry with said second opening in said top of said dust collector casing when the same is fully moved into said enclosure, said air inlet being adapted to be connected with a coupling head of said flexible hose for the passage of dust-containing air into said dust collector casing; an air outlet formed in said top wall of said enclosure adjacent said electrically operated fan; means rotatably mounted on said filter assembly for removing dust therefrom and including means being adapted to be drivingly connected to means on said cord stowing means when said dust collector casing is fully moved into said enclosure; and cover means designed to be detachably fitted over at least said top wall of said enclosure to cover said hose stowing means, said cover means having its top designed to provide a seat.

3,888,644

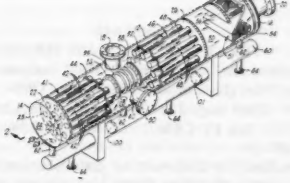
FILTER-SEPARATOR APPARATUS

Robert F. Holland, Yokohama, and Adrian J. Peterson, Tokyo, both of Japan, assignors to Black, Sivalls & Bryson, Inc., Houston, Tex.

Filed Dec. 3, 1973, Ser. No. 421,423

Int. Cl. B01d *50/00*

U.S. Cl. 55—318 **8 Claims**



6. A separator for removing solid particles and entrained liquids from a gas stream which comprises:

a closed horizontal vessel having forward and rearward ends;

a first upright partition having a central opening and a plurality of smaller openings positioned in spaced relationship around said central opening attached within said vessel so that a closed first compartment is formed in the forward end thereof;

a second upright partition having a central opening and a plurality of smaller openings positioned in spaced relationship around said central opening attached within said vessel so that a closed second compartment is formed between said first and second partitions and a closed third compartment is formed at the rearward end of said vessel;

a conduit having forward and rearward ends disposed within said second compartment, the forward end being sealingly attached to said central opening in said first partition and the rearward end being sealingly attached to the central opening in said second partition thereby communicating said first and third compartments, said conduit including a removable section positioned therein;

a first plurality of filter elements disposed within said second compartment connected to said smaller openings in said first partition so that gas passing through said plurality of filter elements is caused to flow through said smaller openings into said first compartment, and then through said conduit into said third compartment;

a second plurality of filter elements disposed within said second compartment connected to said smaller openings in said second partition so that gas passing through said second plurality of filter elements is caused to flow through said smaller openings into said third compartment;

a gas stream inlet connection attached to said vessel and opening into said second compartment at a location betwen said first and second pluralities of filter elements disposed therein;

an access connection attached to said vessel and opening into said second compartment;

an outlet connection attached to said vessel and opening into said third compartment for withdrawing gas therefrom;

liquid coalescing means secured within said third compartment so that gas passing through said third compartment is caused to flow through said liquid coalescing means prior to being withdrawn by way of said outlet connection; and

at least one liquid outlet connection attached to said vessel for removing separated liquids therefrom.

3,888,645

TREATMENT OF GLASS FIBERS

Alfred Marzocchi, Cumberland, R.I., assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Aug. 2, 1973, Ser. No. 385,126
Int. Cl. C03c *25/02*; B32b *17/04*
U.S. Cl. 65—3 **11 Claims**

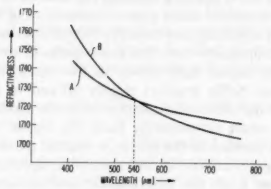
1. A method for treatment of glass fibers comprising the steps of coating the glass fibers in a nascent state with an epihalohydrin and a polyhydroxylated compound and heating the resulting coated glass fibers to react the epihalohydrin with the polyhydroxylated compound on the glass fiber surfaces to form a thin sheath of a polyepoxide on the surfaces.

3,888,646

PROCESS FOR PRODUCING SPECIAL FILTER

Takayuki Kuriyama, and Motohiko Yagi, both of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Ashigara, Japan

Filed Dec. 3, 1973, Ser. No. 421,172
Claims priority, application Japan, Dec. 1, 1972, 47-120460
Int. Cl. C03b *23/20*; G02b *27/02*; C03b *35/04*
U.S. Cl. 65—18 **5 Claims**



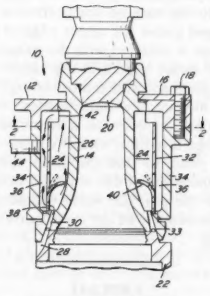
1. A process for producing a special filter comprising a glass composite, said composite comprising a glass matrix, which is solid at room temperature, containing dispersed therein fine particles of another glass, which is solid at room temperature, whose refractive index is the same as that of said glass matrix at a specific wavelength but different from that of said glass matrix at other wavelengths, and showing a maximum percent transmission at said specific wavelength, said glass dispersed in said glass matrix having a softening point higher than that of said glass matrix which comprises hot pressing a mixture of particles of said glasses in vacuo at a temperature higher than the softening point of said glass matrix but lower than the softening point of said dispersed glass, under a pressure of 50 to 3,000 kg/cm².

3,888,647

AIR COOLED ANNULAR PARISON BLANK MOLD

Donald H. Breeden, Millville, N.J., and John M. Bowles, Winchester, Ind., assignors to Maul Bros. Inc., Millville, N.J.

Filed Apr. 15, 1974, Ser. No. 461,059
Int. Cl. C03b *9/38*
U.S. Cl. 65—29 **20 Claims**



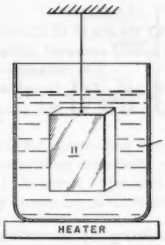
18. A method of cooling a parison blank mold comprising the steps of providing first and second annular flow chambers around a blank mold with the first chamber being between the second chamber and the blank mold, using the suction side of a vacuum pump to cause some air to cool said mold by flowing from an inlet through the first chamber and then to the second chamber, using the suction side of said vacuum pump to cause some air to flow from said inlet to said second chamber without the air passing through any substantial portion of said first chamber, and controlling the amount of air flowing from said

inlet to at least one of said chambers to thereby control the cooling effect of the air on said mold.

3,888,648
METHOD FOR FORMING AN OPTICAL WAVE GUIDE COUPLER

Edward J. West, Silesia, Md., and Thomas G. Giallorenzi, Alexandria, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 313,003, Dec. 7, 1972, Pat. No. 3,802,761. This application Mar. 6, 1974, Ser. No. 448,581
Int. Cl. C03c *25/02, 15/00*
U.S. Cl. 65—30 **10 Claims**



1. A method of forming an optical waveguide-coupler in a rectangular glass substrate along the outer surfaces by exchange of component ions, which comprises:

heating to a molten solution a compound comprising ions to be exchanged with ions in said substrate;

extending said glass substrate linearly into said molten solution with a linear portion thereof extending from said molten solution;

leaving said glass substrate extended into said molten solution at the same depth for a time period sufficient to exchange a layer of component ions along the surfaces of said glass substrate extending within said molten solution with ions of said molten solution surrounding said substrate; and

removing said substrate from said solution at the end of said time period;

whereby a waveguide layer is formed along the surface with a tapered edge extending above said molten solution at the transition region between the ion exchange layer formed within the molten compound and the unexchanged region of said substrate;

said tapered edge of ion exchanged area extending downwardly and inwardly from the outer surface to the inner face of the ion exchange region.

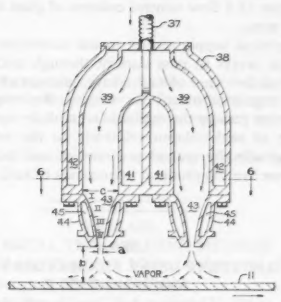
3,888,649
NOZZLE FOR CHEMICAL VAPOR DEPOSITION OF COATINGS

Krishna Simhan, Fischbach, Germany, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 15, 1972, Ser. No. 315,394
Int. Cl. C23c *11/00, 13/00*
U.S. Cl. 65—60 **5 Claims**

1. A method of applying a coating to a surface of a substrate, comprising the steps of:

moving a gaseous mixture comprising at least one coating reactant through a nozzle (1) having an entrance end cross section and an exit end cross section that is smaller than the entrance end cross section and (2) as viewed at the exit end opening having a first pair of opposed interior sides and a second pair of opposed interior sides, the first pair of opposed interior sides having a length greater than the length of the second pair of interior sides to provide the nozzle with an elongated cross-section and at least the first pair of interior sides having increasing radii of curvature from the entrance end opening to the exit end opening to accelerate flow of the gaseous mixture adjacent the interior surfaces of the nozzle; and



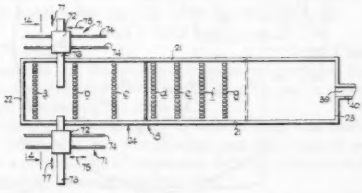
directing the gaseous mixture toward the surface of the substrate to coat the surface of the substrate

---

3,888,650
GLASS MELTING FURNACES

Philip Anthony Maunsell Gell, Enville, and Douglas Graeme Hann, Ryton, both of England, assignors to Elemelt Limited, London, England

Continuation-in-part of Ser. No. 294,097, Oct. 10, 1972, abandoned. This application Nov. 8, 1974, Ser. No. 522,276
Claims priority, application United Kingdom, Oct. 2, 1971, 45942/71; Dec. 17, 1971, 58763/71
Int. Cl. C03b *5/36*
U.S. Cl. 65—125 **15 Claims**



1. In a glass supply furnace comprising a bottom wall and upstanding side walls defining an elongate furnace chamber for longitudinal flow of a body of glass from a charging station, adjacent to one end, to a withdrawal station adjacent to the opposite end of said chamber and at which said chamber has outlet means for withdrawing glass at a level in the region of the surface of the glass, said chamber having a melting zone extending over part of the length of said chamber downstream from said one end and in which glass making batch materials in the solid state are present on the upper surface of the glass body, a conditioning zone extending over a further part of the length of said chamber upstream from said other end but terminating at a distance from said melting zone, in which conditioning zone said chamber affords a free space above the glass and the glass is isolated from physical disturbance other than said longitudinal flow, a refining zone extending over the remaining part of the length of said chamber intermediate said melting and conditioning zones and from which said batch materials are absent, and heating means for heating the glass body generally throughout said melting and refining zones, improved means for controlling the flow of glass comprising:

a. longitudinally spaced electrode arrays each extending upwardly from said bottom wall in an area in which, except for

said electrode arrays, said chamber affords, throughout substantially the entire depth of said body of glass, an unobstructed space for said longitudinal flow of glass, each of said electrode arrays extending transversely of said chamber across substantially the entire width thereof to define the longitudinal boundaries of a flow control column of glass situated in said refining zone,

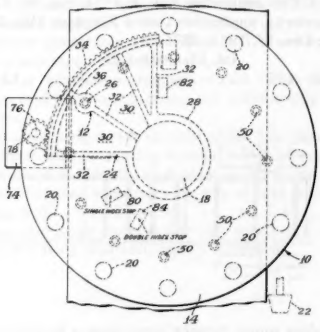
b. electrical supply circuit means connected to said electrode arrays to pass current through said column from one to the other of said arrays, said circuit means including regulator means for varying the magnitude of the current passing through said column to vary the temperature of said column relatively to the temperatures of longitudinally spaced portions of said body of glass at respective longitudinal boundaries of said column.

3,888,651

INTERMITTENT DRIVE MECHANISM FOR GLASS MOLDING TABLE

Richard James, Anderson, Ind., assignor to Lynch Corporation, Anderson, Ind.

Filed Dec. 10, 1973, Ser. No. 423,113
Int. Cl. C03b 9/00
U.S. Cl. 65—361 **3 Claims**



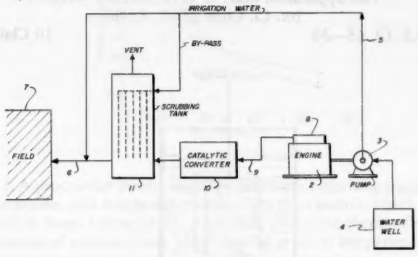
1. Apparatus for imparting intermittent motion to a glass mold supporting table, said apparatus comprising, in combination, a base, a substantially horizontal mold supporting table carried on said base for movement in a forward direction only, an arm carried on said base for movement in a forward direction for a preselected distance, and in a reverse direction for said preselected distance, drive means for selectively moving said arm in said forward and reverse directions, a movable connector member carried on said arm, a plurality of spaced receiving means on said base for receiving said connector member, and means for moving said connector member into interlocking relationship with one of said receiving means when said arm is moved in said forward direction by said drive means and for moving said connector member from said interlocking relationship when said arm is moved in said reverse direction while said table remains in a stationary condition.

3,888,652

IRRIGATION ENGINE EXHAUST CONVERSION TO OBTAIN FERTILIZING SOLUTION

Gene G. Yie, Chicago, Ill.; S. J. Cummingham, Palos Verdes, Calif., and Robert E. Rosenberg, Hinsdale, Ill., assignors to Institute of Gas Technology, Chicago, Ill. and Southern California Gas Company, Los Angeles, Calif., part interest to each

Filed May 29, 1973, Ser. No. 364,656
Int. Cl. A01c 23/04
U.S. Cl. 71—61 **8 Claims**



1. A method of fertilizing by converting exhausts from irrigation pump engines to obtain aqueous ammonia solutions, which includes the steps of:

delivering exhaust from the irrigation pump engine to a catalytic conversion zone, said catalytic conversion zone containing catalysts for treating nitric oxide emissions to directly obtain ammonia in place under exhaust temperature conditions,

delivering a portion of a body of water pumped by the irrigation engine to a scrubbing chamber,

intimately contacting the formed gaseous ammonia with the water in said scrubbing chamber to form an aqueous ammonia solution,

returning said aqueous ammonia solution to the body of water, and

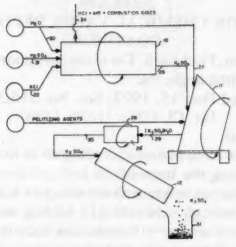
discharging said aqueous ammonia solution to fertilize a crop area.

3,888,653

METHOD OF PRODUCING PLANT FOOD

Samuel John Shirley, London, Ontario, Canada, assignor to Shamrock Chemicals Limited, Ontario, Canada

Filed Aug. 29, 1973, Ser. No. 392,563
Claims priority, application Canada, Oct. 23, 1972, 154424
Int. Cl. C05d 1/02
U.S. Cl. 71—61 **11 Claims**

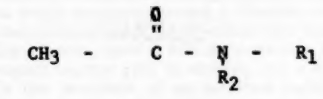


1. A method of producing a potassium sulphate fertilizer from spent sulfuric acid having impurities therein comprising the steps of:

a selecting as a first feed material spent sulfuric acid,
b selecting, as a second feed material, one consisting essentially of potassium chloride;
c mixing the first and second feed materials to achieve a feed mix;
d heating the feed mix at an elevated temperature in excess of 300°F whereby the potassium sulphate fertilizer is created in fine crystalline powder;
e mixing the recovered crystalline potassium sulphate with granulating agents and small amounts of water until the potassium sulphate congeals into small pellets; and
f grading the pellets into a predetermined range of sizes.

3,888,654
TOBACCO SUCKER CONTROL
Walter W. Abramitis, Downers Grove, Ill., assignor to Akzona Incorporated, Asheville, N.C.
Filed Apr. 5, 1973, Ser. No. 348,391
Int. Cl. A01n *5/00*
U.S. Cl. 71—78 **8 Claims**

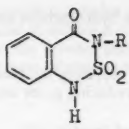
1. Composition for controlling the growth of suckers in tobacco plants, consisting essentially of:
a. from about 10 to about 75 percent by weight of a member of the group consisting of an N-substituted acetamide of the formula:



in which R_1 is selected from the group consisting of hydrogen, methyl, and cyclohexyl; R_2 is selected from the group consisting of alkyl having 6 to 15 carbon atoms, cyclohexyl, and cyclododecyl; and the soluble mineral acid salts thereof selected from the group consisting of the hydrochloride, phosphate and sulfate;
b. from about 0.05 to about 10 percent by weight of a surface active agent; and
c. from about 40 to about 80 percent of the total weight of the composition of an alkanol having 6 to 12 carbon atoms.

3,888,655
SYNERGISTIC HERBICIDAL MIXTURE
Adolf Fischer, Mutterstadt, Germany, assignor to Badische Anilin- Soda-Fabrik Aktiengesellschaft, Ludwigshafen/Rhine, Germany
Filed Mar. 22, 1973, Ser. No. 343,629
Claims priority, application Germany, Apr. 13, 1972, 2217722
Int. Cl. A01n *9/12*
U.S. Cl. 71—91 **4 Claims**

1. A herbicidal composition consisting essentially of an inert carrier containing a herbicidally effective amount of a mixture of
a. a compound of the formula



where R denotes lower alkyl of a maximum of 4 carbon atoms, or an alkali metal, ammonium, hydroxyalkylammonium, alkylammonium or hydroxy alkylalkyl ammonium salt thereof, and
b. 2,6-dichlorobenzonitrile in a weight ratio of *a* to *b* in the range of 5:1 to 1:5.

3,888,656
CHEMICAL TREE-PRUNING METHOD
Harvey D. Bidlack, Shepherd, Mich., assignor to The Dow Chemical Company, Midland, Mich.
Filed Dec. 17, 1973, Ser. No. 425,391
Int. Cl.² A01N *9/22*
U.S. Cl. 71—94 **1 Claim**

1. A method useful for chemically pruning trees which comprises applying to the upper branches of a growing tree an effective amount of naphtho(2,1-b)quinolizinium bromide whereby a constriction is caused to occur in the apical region so that the new growth from the apices of the treated branches occurs beyond a constriction and droops downward vertically, whereby a light breeze or stronger air movement breaks off the downwardly drooping new growth.

3,888,657
PROCESS FOR PRODUCTION OF METAL POWDERS HAVING HIGH GREEN STRENGTH
Erhard Klar, Baltimore, Md., and Elbert K. Weaver, Westborough, Mass., assignors to SCM Corporation, Cleveland, Ohio
Continuation of Ser. No. 102,682, Dec. 30, 1970, abandoned. This application Apr. 23, 1973, Ser. No. 353,659
Int. Cl. B22f *9/00*
U.S. Cl. 75—0.5 B **16 Claims**

1. A process for the production of metal particles from finely divided atomized metal particulates for use in powder metallurgy comprising the steps of:
a. disposing said particulates in a loose mass and heating said loose mass at a temperature and for a time to produce a porous cake of miniumum density, said cake being particulates sintered together; and
b. breaking up said cake into particles each having multiple particulates and having a particle size substantially greater than said particulates, said cake being broken up under conditions which minimize densification.

3,888,658
PROCESS FOR THE DIRECT REDUCTION OF IRON ORE TO STEEL
William E. Shoupp, and James H. Bechtold, both of Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Continuation of Ser. No. 86,203, Nov. 2, 1970, abandoned. This application Jan. 22, 1973, Ser. No. 325,483
Int. Cl. C21c *5/52;* **C21b** *1/02*
U.S. Cl. 75—11 **5 Claims**

1. A process for producing steel and the production of gases, the reduction of iron ore, generation of power and utilization of the power and reduced ore to form steel, the steps comprising:
a. converting carbonaceous fuel to a mixture of at least two gas streams, one of said gas streams containing a high proportion of hydrocarbons and other stream containing reducing gases including a high proportion of CO and H_2;

b. conveying the hydrocarbons and distributing a portion thereof to a
1. gas turbine;
2. a boiler, and recycling the balance;
c. conveying the reducing gases and distributing a portion thereof to:
1. a fluidized bed reactor; and
2. the gas turbine;
d. reacting the reducing gases with iron ore in the fluidized bed reactor to produce iron particles and heat;
e. transferring the reduced iron particles to an electric arc furnace and adding thereto scrap and fluxes;
f. reacting a portion of the gaseous hydrocarbons, reducing gases, spent gases and heat from the fluidized bed reactor in the gas turbine coupled to an electrical generator for the production of electrical power;
g. generating steam by reacting in a boiler the combustion products of the gas turbine, a portion of the spent gases from the fluidized bed reactor and a portion of the gaseous hydrocarbons;
h. conveying the steam to a steam turbine connected to an electrical generator for producing electrical power; and
i. melting the contents of the electric arc furnace by utilizing the generated electrical power to form an arc thereby supplying the heat necessary for melting and refining said contents of said furnace for the production of steel.

3,888,659

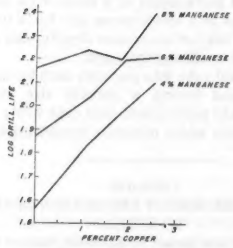
FREE MACHINING AUSTENITIC STAINLESS STEEL

Joseph A. Ferree, Jr., Natrona Heights, Pa., assignor to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 740,807, May 29, 1968, Pat. No. 3,460,939, which is a continuation-in-part of Ser. No. 418,991, Dec. 17, 1964, abandoned. This application June 18, 1969, Ser. No. 834,477The portion of the term of this patent subsequent to Aug. 12, 1986, has been disclaimed.

Int. Cl. C22c *39/26*

U.S. Cl. 75—125 **6 Claims**



1. A free machining, austenitic stainless steel consisting essentially of from a trace up to 0.15 percent carbon, from 2 to 10 percent manganese, from 4 to 13 percent nickel, from 10 to 20% chromium, from 0.5 to 3 percent copper, from 0.10 to 0.40 percent sulfur, 2 percent maximum silicon, and 0.10 percent maximum nitrogen, balance essentially iron and residual impurities, the constituents being controlled so that the delta ferrite forming characteristic is less than 10 according to the formula:

$$\text{delta ferrite potential} = \%\,Cr + 1.5(\%\,Si) - .87\,[30(\%\,C + \%\,N) + \%\,Ni + 0.5(\%Mn) + 0.3(\%\,Cu)] + 1,$$

and wherein the amount of copper is controlled so that it does not exceed 3.85 – 0.18 (% Mn- – 55/32% S).

3,888,660

ZINC ALLOY FOR BEARING

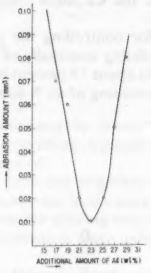
Akira Ebata, Fujisawa, and Teiji Kodate, Machida, both of Japan, assignors to Oiles Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 18, 1973, Ser. No. 425,714

Claims priority, application Japan, Dec. 25, 1972, 47-86394; Aug. 2, 1973, 48-129396

Int. Cl. C22c *21/00; 21/04*

U.S. Cl. 75—178 A **9 Claims**



1. An alloy for bearings consisting essentially of about 17–27 wt% of Al, about 2–4 wt% of Si, about 0.1–0.5 wt% of Ti and the remainder Zn.

3,888,661

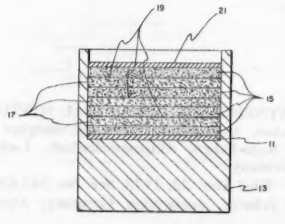
PRODUCTION OF GRAPHITE FIBER REINFORCED METAL MATRIX COMPOSITES

Albert P. Levitt, Newton Center, and Eugene Di Cesare, Wayland, both of Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Continuation of Ser. No. 278,129, Aug. 4, 1972, abandoned. This application Apr. 16, 1974, Ser. No. 461,318

Int. Cl.[2] B22F *7/02, 3/14;* **B32B** *15/00, 31/20*

U.S. Cl. 75—201 **11 Claims**



1. Method of producing a high strength composite article comprising placing in a hollow hot-press die a plurality of repeating sets of alternating layers of

A. a matrix metal selected from the group consisting of magnesium powder or magnesium alloy,

B. graphite fibers, and

C. titanium powder as a wetting and bonding agent between said matrix metals and graphite fibers, said titanium powder being present in an effective amount of up to about 4% by weight of said composite article, and

hot-pressing said layers at a temperature of about 725°–800°C, said temperature being sufficient to melt only said matrix metal, and at a pressure sufficient to form a compact.

3,888,662

METHOD OF CENTRIFUGALLY COMPACTING GRANULAR MATERIAL USING A DESTRUCTIBLE MOLD

Benjamin Clark Boeckeler, Greensburg, Pa., assignor to Kennametal Inc., Latrobe, Pa.

Filed Feb. 9, 1973, Ser. No. 330,964

Int. Cl. B22f *3/06*; **B29f** *5/02*

U.S. Cl. 75—203 **11 Claims**

1. A method of making a sintered compact from particulate material which comprises; forming a flowable slurry of the particulate material and a liquid vehicle, said liquid vehicle including a holding agent to hold the particulate material in the compact together prior to sintering and a lubricant to promote free movement of the individual particles of the particulate material relative to each other during the centrifuging, placing the slurry in a mold which is closed on the bottom and on the sides and open only at the top and which is not soluble in said vehicle but which is soluble in a solvent different from any part of said vehicle, centrifuging the mold and the slurry contained therein to precipitate the particulate material with the open top of the mold facing the axis to form a compact which rests on the closed bottom of the mold, placing the mold and the compact therein into a bath of said solvent for the mold at least to soften the mold on the compact, removing the softened mold from the compact, drying the compact said solvent also being inert and immiscible with respect to said compact and the liquid fraction of said slurry and sintering the dried compact.

3,888,663

METAL POWDER SINTERING PROCESS

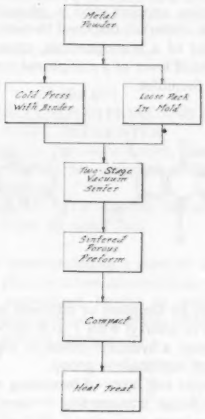
Steven H. Reichman, Ann Arbor, Mich., assignor to Federal-Mogul Corporation, Southfield, Mich.

Filed Oct. 27, 1972, Ser. No. 301,433

Int. Cl. B22f *3/16*

U.S. Cl. 75—221 **11 Claims**

1. A process for making sintered articles which comprises the steps of providing a mass of nickel-base superalloy powder having an oxygen content of less than about 300 ppm and of the type characterized as normally having carbide and gamma-prime strengthening, forming said mass of powder into a three-dimensional shape of the desired configuration, heating the shaped said mass of powder in the substantial absence of a surrounding atmosphere to a first sintering and transformation temperature ranging from about 1600° to about 2000°F at which the chemical equilibrium is conducive for effecting a conversion of primary carbides to complex carbides, maintaining said mass at said first sintering temperature for a period of time to effect an appreciable conversion of said primary carbides to said complex carbides under the prevailing equilibrium conditions and to initiate a diffusion bonding and neck formation between the powder particles at their points of contact, heating said mass of powder to a second sintering temperature above said first temperature up to the incipient melting point of said powder particles for a period of time sufficient to effect growth of said neck and the formation of an integral porous sintered preform, and thereafter cooling said preform.



3,888,664

ELECTROPHOTOGRAPHIC PRINTING

Lee A. Carlson, Ashland, and Richard G. Miekka, Sudbury, both of Mass., assignors to Dennison Manufacturing Company, Framingham, Mass.

Filed Oct. 28, 1970, Ser. No. 84,811

Int. Cl. G03g *13/14*, *13/22*

U.S. Cl. 96—1.4 **10 Claims**

1. An electrophotographic printing process comprising the steps of

charging a photoconductive plate uniformly;

irradiating said charged plate with an image pattern to produce an electrostatic latent image thereon;

applying a first developer material having a conductivity which is greater than the conductivity of said photoconductive plate to said charged plate to produce a conductive image thereon;

fixing said conductive developed image on said plate to form a master plate;

charging said master plate with a charge having a preselected polarity, the image areas on said plate having a relatively low charge acceptance as compared to the non-image areas thereon;

applying a second developer material with a charge of the same polarity as said preselected polarity to said master plate, said second developer material adhering to the fixed conductive image areas to form a visible unfixed image on said master plate;

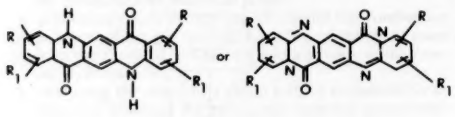
transferring said visible unfixed image formed by said developer material to a transfer sheet to reproduce said image pattern on said transfer sheet.

3,888,665
ELECTROPHOTOGRAPHIC RECORDING MATERIAL WITH QUINACRIDONES

Wolfgang Wiedemann, Geisenheim-Johannisberg, Germany, assignor to Hoechst Aktiengesellschaft, Germany

Filed Apr. 25, 1973, Ser. No. 354,183
Int. Cl. G03g *5/02*
U.S. Cl. 96—1.5 **14 Claims**

1. Electrophotographic recording material comprising an electroconductive support and a photoconductive double layer of organic materials disposed thereon, said double layer being composed of a homogeneous, opaque, charge carrier producing dyestuff layer of a compound corresponding to one of the general formulae



wherein

R and R_1 may be the same or different and stand for hydrogen, alkyl or alkoxyl with 1 to 4 carbon atoms, halogen, a nitro group, a hydroxyl group, or together form a fused benzene or naphthalene group,

and a transparent top layer of insulating material containing at least one charge transporting compound, in which the transparent top layer comprises a mixture of a binder with a charge-transporting, monomeric heterocyclic compound having an extended π-electron system which is substituted by at least one dialkylamino group or by two alkoxy groups, or with a condensation product of 3-bromopyrene and formaldehyde.

3,888,666
REVERSAL DEVELOPING METHOD USING PHOTOCONDUCTIVE DEVELOPING ELECTRODE

Seiji Matsumoto, and Vasuo Tamai, both of Osaka, Japan, assignors to Rank Xerox, Limited, London, England

Division of Ser. No. 210,883, Dec. 22, 1971, Pat. No. 3,800,744. This application Aug. 27, 1973, Ser. No. 391,926
Int. Cl. G03g *13/06, 13/22*
U.S. Cl. 96—1 R **10 Claims**

1. A method for performing reversal development of an electrostatic image comprising the steps of forming a latent image upon a first grounded photoconductive insulator as a pattern of charged and discharged areas, charging a second grounded photoconductive insulator spaced from the first photoconductive insulator, to the same level and polarity as said first photoconductive insulator charged area, and applying liquid developing particles to the space between said insulators, said liquid developing particles charged to the same level and polarity as said first photoconductive insulator charge area.

3,888,667
HETEROPHASE ADHESIVE COMPOSITIONS CONTAINING POLYSULFONE FOR METAL-SELENIUM COMPOSITES

Lieng Huang Lee, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 17, 1973, Ser. No. 389,282
Int. Cl. G03g *5/02*
U.S. Cl. 96—1.5 **13 Claims**

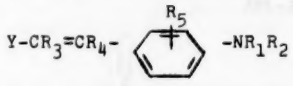
1. A xerographic member which comprises a conductive substrate having thereon an interfacial barrier layer having a thickness of about 0.5 to 3.0 microns, said barrier layer comprising a polymer blend or mixture of a polysulfone and an elastomeric polymer which contains polar groups, with the elastomeric polymer being present in a concentration of from about 5 to 35 weight percent, and a photoconductive layer about 10 to 200 microns in thickness overlaying said interfacial layer.

3,888,668
IMAGING MEDIUM COMPRISING PHOTOCONDUCTOR OF TiO_2 AND SENSITIZING DYE

Juergen H. H. Keller, Chelmsford, Mass., assignor to Itek Corp., Lexington, Mass.

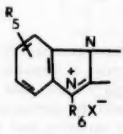
Division of Ser. No. 796,167, Feb. 3, 1969, Pat. No. 3,574,612. This application Oct. 2, 1972, Ser. No. 293,908
Int. Cl. G03g *5/00*
U.S. Cl. 96—1.6 **9 Claims**

1. An image reproduction medium comprising (1) a photoconductor comprising a radiation activatable photosensitive titanium dioxide and (2) a sensitizing dye compound of the formula:

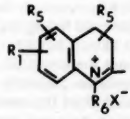


wherein Y is a radical of a heterocyclic aromatic compound containing at least one quaternary nitrogen hetero atom; and wherein Y is selected from the group consisting of:

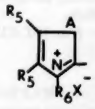
FORMULA I



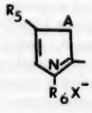
FORMULA II



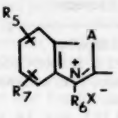
FORMULA III



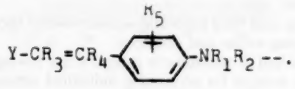
FORMULA IV



FORMULA V



wherein A is oxygen, sulfur or selenium; R_7 is alkoxy or amino; R_6 is selected from the group consisting of hydrogen, alkyl, aralkyl and hydroxyalkyl; and X is a negative radical; R_1 and R_2 are each hydroxyalkyl; R_3 and R_4 are each selected from the group consisting of hydrogen and alkyl; and R_5 is selected from the group consisting of hydrogen, alkyl, aryl, aralkyl, alkoxy, and NR_1R_2 wherein R_1 and R_2 are each as described herein.

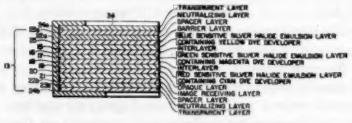


3,888,669

PHOTOGRAPHIC PRODUCTS AND PROCESSES WITH BARRIER LAYERS FOR DIFFUSABLE DYES

Paul A. Cardone, Framingham, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Sept. 4, 1973, Ser. No. 393,799
Int. Cl. G03c *7/00, 5/54, 1/40*
U.S. Cl. 96—3 **27 Claims**



1. A composite photographic diffusion transfer process film unit which comprises, in combination and in sequence, a first dimensionally stable transparent layer; a dyeable layer adapted to receive diffusion transfer process dye diffusing thereto; an opaque layer; a photosensitive silver halide layer having associated therewith a diffusion transfer process dye image-forming material adapted to provide, as a function of photoexposure, an imagewise distribution of dye possessing a first molecular size which is diffusible to said dyeable layer; a transparent polymeric layer impermeable to dye possessing said first molecular size and permeable to processing composition molecules possessing a second molecular size less than said first molecular size; a second dimensionally stable transparent layer; means for providing a processing composition intermediate the second dimensionally stable transparent layer and the dye image-forming material impermeable layer; and means for maintaining the composite unit intact subsequent to diffusion transfer processing.

3,888,670

IMAGING METHOD

Milan Stolka, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 2, 1973, Ser. No. 412,523
Int. Cl. B44f *1/10;* **G03c** *11/22, 5/04, 1/58, 1/52*
U.S. Cl. 96—27 R **15 Claims**

1. An imaging method which comprises:

a. contacting a substrate having dispersed on its surface in an imagewise configuration a film of a polyene having at least two conjugated double bonds per molecule with a solution of maleic anhydride to form a reaction product between the polyene and maleic anhydride,

b. contacting the reaction product with a base to convert the carboxylic acid anhydride group of the maleic anhydride to its corresponding salt, and

c. contacting the salt with a solution of a dye containing a colored cation capable of replacing the cation of said salt.

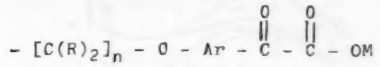
3,888,671

PHOTOREACTIVE COMPOSITIONS AND PRODUCTS MADE THEREWITH

Thaddeus M. Muzyczko, Downers Grove, and Thomas H. Jones, Naperville, both of Ill., assignors to The Richardson Company, Des Plaines, Ill.

Filed June 29, 1972, Ser. No. 267,475
Int. Cl. G03f *7/02*
U.S. Cl. 96—33 **10 Claims**

1. A lithographic plate including a support member and a film formed from a photoreactive composition, said composition comprising a compound having at least two alkoxyaromaticglyoxy substituents per molecule, which substituents have the following general formula:



wherein R is selected from the class consisting of H, aryl, alkyl, halo and aralkyl having up to 10 carbon atoms and n is integer from 1 to 18, Ar is an aromatic substituent and M is selected from the class consisting of H, alkali metal, ammonium and substituted ammonium, said compound having the following general formula:

3,888,672

PHOTOPOLYMERIZABLE PROCESS CAPABLE OF YIELDING A REVERSE IMAGE

Shung-Yan Luke Lee, Wilmington, Del., assignor to E. I. du Pont de Nemours & Company, Wilmington, Del.

Division of Ser. No. 276,381, July 31, 1972, Pat. No. 3,782,951. This application Sept. 4, 1973, Ser. No. 394,262
Int. Cl. G03c *5/26, 1/68, 1/86, 1/94, 1/78*
U.S. Cl. 96—35.1 **9 Claims**

1. A process of forming a reverse image in a photopolymerizable composition consisting essentially of

a. a hydrogen- or electron-donor compound,

b. a hexaarylbiimidazole,

c. an ethylenically unsaturated compound capable of forming a high polymer by free radical initiated, chain propagating, addition polymerization, and

d. an organic polymer binder, wherein the concentrations of the components are, by weight, less than 0.4% (a), at least 1% (b), 30–70% (c), and 68–28% (d), with the ratio of (b)/(a) being 10/1 or greater, said process comprising

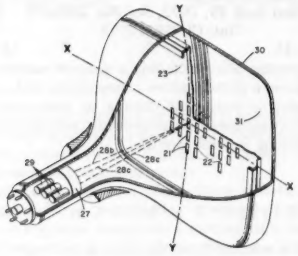
1. imagewise exposing said composition to radiation which destroys polymerizability of the composition in the exposed areas, and

2. exposing the entire composition to radiation which induces photopolymerization in the previously unexposed areas.

3,888,673
METHOD AND APPARATUS FOR MAKING ELECTROLUMINESCENT SCREENS FOR COLOR CATHODE RAY TUBES

Takeshi Suzuki, Fukaya; Shigeo Takenaka, Kanagawa; Hiroshi Tanaka, Fukaya, and Masanori Akiyama, Honjo, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki-shi, Japan

Filed Aug. 21, 1973, Ser. No. 390,253
Claims priority, application Japan, Aug. 21, 1972, 47-82832; Aug. 23, 1972, 47-83711
Int. Cl. G03c 5/00
U.S. Cl. 96—36.1 9 Claims



3. A method of preparing a developable pattern comprising continuous vertical stripes on a panel for a color cathode-ray tube comprising:

a. applying a film containing photosensitive material having a predetermined solvency in response to incident light onto the panel for the cathode-ray tube;

b. attaching to said panel a shadow mask with a concave face having a number of beam-passable apertures arranged in rows substantially parallel with each other, said apertures in each of said rows being separated from each other by beam-intercepting bridging portions in each of the rows;

c irradiating said shadow mask with light from a light source placed at a predetermined position with respect to said panel on the opposite side of said shadow mask from said panel to project said light on said film on the panel in a pattern comprising images defined by the apertures of said shadow mask, controlling the light emanated by said light source to limit the irradiation of said shadow mask to an area covering a partial length of the rows of the apertures, said lighted area being limited in length in the direction of said rows of apertures, the length of said lighted area having a nearly equal angle of inclination with respect to the vertical axis of said screen, said light source having a sufficient effective length to produce on said film an image of each aperture so expanded in the lengthwise direction as to be connected with the image of each adjacent aperture in the lengthwise direction to form said continuous vertical stripes;

d. moving said light source back and forth in a direction perpendicular to the longitudinal axis of said light source with predetermined amplitude and frequency to superpose the radiation patterns on said screen from said light source through each of said apertures and thereby substantially reduce diffraction phenomena effects on the radiation pattern on said screen.

3,888,674
AUTOMATIC SLICE PROCESSING

James L. Nygaard, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 280,317, Aug. 14, 1972, Pat. No. 3,812,947, which is a division of Ser. No. 845,733, July 29, 1969, Pat. No. 3,765,763. This application Nov. 23, 1973, Ser. No. 418,637
Int. Cl. B44d 1/18; B05b 13/02; B23q 5/22
U.S. Cl. 96—36 2 Claims

1. A method of spraying a fluid on a semiconductor slice comprising the steps of:

a. positioning a semiconductor slice on a spindle;

b. securing said semiconductor slice to said spindle;

c. lowering said spindle including said secured semiconductor slice into a chamber;

d. rotating said spindle including said secured semiconductor slice once said spindle has been lowered into said chamber; and

e. spraying said fluid onto said semiconductor slice while it is rotating within said chamber.

2. In a method of operating an assembly line having a plurality of work stations for processing individual semiconductor slices, said slices each having two major surfaces, the sequence of steps of:

a. providing a plurality of semiconductor slices having an oxide layer adherently formed on one of their two major surfaces;

b. individually transporting said semiconductor slices along a predetermined path to a first spraying station;

c. individually spraying said semiconductor slices including said oxide layer with a cleaning solution while individually rotating said semiconductor slices at said first spraying station;

d. individually transporting said semiconductor slices along a predetermined path to a first flipping station;

e. individually flipping said semiconductor slices so that the orientation of said two major surfaces is reversed at said first flipping station;

f. individually transporting said semiconductor slices along a predetermined path to a second spraying station;

g. individually spraying a photoresist material on the other of the two major surfaces of said semiconductor slices while rotating said semiconductor slices to form a first photoresist coating on said semiconductor slices at said second spraying station;

h. individually transporting said semiconductor slices along a predetermined path to a first heating station;

i. individually heating said semiconductor slices to cure said first photoresist coating at said first heating station;

j. individually transporting said semiconductor slices along a predetermined path to a second flipping station;

k. individually flipping said semiconductor slices so that the orientation of said two major surfaces is again reversed at said second flipping station;

l. individually transporting said semiconductor slices to a third spraying station;

m. individually spraying a photoresist material on the oxide layer of said semiconductor slices while rotating said semiconductor slices to form a second photoresist coating on said semiconductor slices at said third spraying station;

n. individually transporting said semiconductor slices along a predetermined path to a second heating station;

o. individually heating said semiconductor slices to cure said second photoresist coating at said second heating station;

p. individually transporting said semiconductor slices along a predetermined path to an aligning and exposing station;

q. precisely aligning said second photoresist coating with a patterned mask and exposing said second photoresist coating to a light source through such mask at said aligning and exposing station;

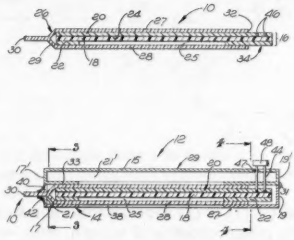
r. individually transporting said semiconductor slices along a predetermined path to a fourth spraying station; and

s. individually spraying a photoresist developer on said second photoresist coating while individually rotating said semiconductor slices to remove the portions of the second photoresist coating that were not exposed to the light source at said fourth spraying station.

3,888,675
SINGLE FILM LIGHT-PROTECTED PHOTOSENSITIVE ELEMENT

Richard A. Corrigan, Temple City, Calif., assignor to Bell & Howell Co., Pasadena, Calif.

Division of Ser. No. 381,454, July 23, 1973, Pat. No. 3,821,762. This application Jan. 24, 1974, Ser. No. 436,261
Int. Cl. G03c *3/00*; **G03b** *17/50*
U.S. Cl. 96—67 **4 Claims**



1. A photographic medium slide packet, comprising:

A. a single film unit comprising

a single sheet of generally flat photographic recording medium of extended surface area;

a first layer of inert material releasably secured in direct contact against, and generally extensive with, one side of said recording medium;

a second layer of inert material releasably secured in direct contact against, and generally extensive with, the opposite side of said medium and defining a light-transmitting window for exposing said medium; and

B. an outer envelope having opposing inner planar surfaces joined to define a closed end and an opposite open end, the opposing inner planar surfaces of said envelope being disposed in sliding light-sealing abutment with respective ones of said first and second layers whereby to enclose a major part of said film unit leaving a portion thereof unenclosed, said envelope being movable on said unit between positions of exposure and coverage of said window; said unenclosed portion defining means for securing said single sheet against relative movement of said envelope.

3,888,676
SILVER HALIDE FILMS WITH WIDE EXPOSURE LATITUDE AND LOW GRADIENT

Warren William Evans, Highland Park, N.J., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 27, 1973, Ser. No. 391,525
Int. Cl. G03c *1/02*, *1/08*
U.S. Cl. 96—68 **9 Claims**

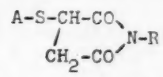
1. A photographic element comprising two silver halide emulsions separately coated or mixed and coated on a film support, one of said emulsions having a lesser degree of chemical sensitization than the other, and both of said emulsions being optically sensitized in the same spectral region.

3,888,677
SILVER HALIDE PHOTOGRAPHIC MATERIAL CONTAINING ANTIFOG AGENT WITH PROTECTED MERCAPTO GROUP

Werner Abele, Neu-Isenburg, and Rudolf Schneider, Sprendlingen, both of Germany, assignors to E. I. du Pont de Nemours & Company, Wilmington, Del.

Filed Oct. 12, 1973, Ser. No. 405,801
Claims priority, application Germany, Oct. 13, 1972, 2250136
Int. Cl. G03c *1/34*
U.S. Cl. 96—76 R **7 Claims**

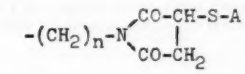
1. Photographic material comprising a film support and at least one light-sensitive silver halide emulsion layer containing an antifog agent or being in contact with an auxiliary layer containing an antifog agent, said antifog agent being present in an antifogging amount and having the formula:



wherein

A is a heterocyclic radical containing nitrogen in a 5- or 6-membered heterocyclic ring, or a 4-acetaminophenyl radical,

R is H, alkyl of 1 to 4 carbon atoms, aryl or



and *n* is 2 to 4.

3,888,678
METHOD FOR ADJUSTING TRIBOELECTRIC CHARGING CHARACTERISTICS OF MATERIALS

William J. Bailey, Jr.; James F. Houle, and Gilden R. Van Norman, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

No Drawing. Division of Ser. No. 163,450, July 16, 1971, abandoned. This application Oct. 9, 1973, Ser. No. 404,552
Int. Cl. G03c *1/78*
U.S. Cl. 96—87 A **78 Claims**

1. A method for adjusting the triboelectric charging characteristics of materials subject to the generation of an electrical charge when a surface thereof is brought into contact with another usually dissimilar surface comprising the steps of:

a. measuring the electrical charge generated when the surface of the material normally subject to charging is brought into contact with said usually dissimilar surface under controlled conditions;

b. measuring the electrical charge generated when surfaces of charge control agents are brought into contact with said usually dissimilar material under controlled conditions;

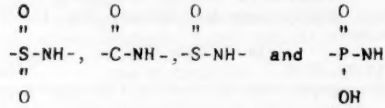
c. based on the results of step (b), selecting at least one charge control agent which is capable of providing the adjustment desired for controlling the charging characteristics of said material; and

d. modifying said material by incorporating at at least one surface thereof said charge control agent selected in step (c) in an amount sufficient to modify the triboelectric charging characteristics of said material and to produce a desired adjustment in the electrical charge of said material determinable by impact electrification of 20 psi impact pressure at 5% relative humidity and 70°F. against a stainless steel or anodized aluminum impacting surface, said charge control agent being selected from the group consisting of:

A. surfactant materials having the generic structure: $[A-Z(CH_2)_n-D]^+ X^-$ wherein

A is a member selected from the group consisting of hydrocarbon chains, partially fluorinated hydrocarbon chains, and fluorocarbon chains;

Z is a member selected from the group consisting of:



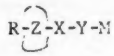
n is an integer ranging from 1 to about 8,

D is

wherein R_1, R_2 and R_3 are selected from the group consisting of hydrogen, lower alkyl and aryl; and

X is an anion;

B. compounds of the following structural formula:



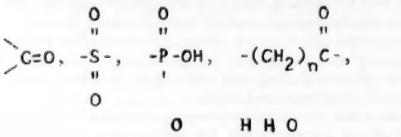
wherein:

Z represents the atoms necessary to constitute a member selected from the group consisting of aromatic hydrocarbon rings and alicyclic structures;

R is selected from the group consisting of single and multiple substitutions of members selected from the group consisting of halogen, nitro, nitroso, hydroxyl, carboxy, cyano, alkoxy, aryloxy, substituted alkoxy, and

wherein R_1 is selected from the group consisting of alkyl, aryl, substituted alkyl or substituted aryl;

X is a member selected from the group consisting of;



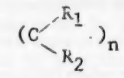
wherein *n* = an integer from 1 to about 10;

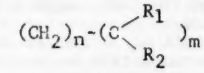
Y is a member selected from the group consisting of (1) O when M is a member selected from the group consisting of hydrogen, ammonium, metallic cations, and amine salt residues;

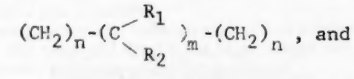
when M is H; and

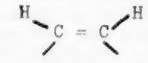
when M is selected from the group consisting of phenyl and substituted phenyl;

C. multifunctional carboxylic acids of the general formula: HOOC—R—COOH wherein R is selected from the group consisting of:

(1) 

(2) 

(3) 

(4) 

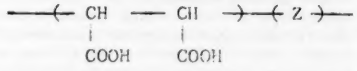
wherein if R = (1) or (2) and R_1 is hydrogen, R_2 is selected from the group consisting of halogen, nitro, aryl, substituted aryl, hydroxyl;

wherein if R = (3), R_1 and R_2 are selected from the group consisting of hydrogen, halogen, nitro, carboxyl, aryl, substituted aryl, alkyl and substituted alkyl;

n and *m* are integers;

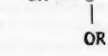
and where R_1 is H, R_2 is a member selected from the group consisting of hydroxyl, hydrogen, halogen, nitro, carboxy, aryl, substituted aryl, alkyl and substituted alkyl;

D. polymeric compounds having structural formulas selected from the group consisting of:

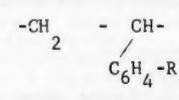
I. 

wherein Z is selected from the group consisting of:

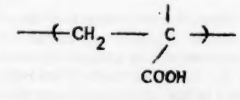
a. $-CH_2-CH_2-$;

(b) 

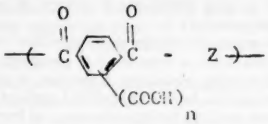
wherein R is lower alkyl; and

(c) 

wherein R is selected from the group consisting of lower alkyl, halogen, hydroxyl and nitro groups;

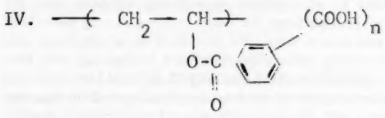
II. 

wherein R is selected from the group consisting of hydrogen and methyl;

III. 

wherein Z represents the atoms necessary to complete a member selected from the group consisting of:

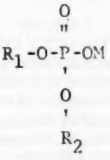
a. a polyester, (b) a polyamide, and (c) a polycarbonate and *n* is an integer from 1 to 4;

IV. 

wherein *n* is an integer from 1 to 4; and

V. polymers containing both hydroxyl and aromatic carboxylic acid groups;

E. compounds of the formula



wherein (1) R_1 is $CH_3-(CH_2)_n$ and *n* is an integer ranging from about 1 to about 19, then R_2 is selected from the group consisting of H, R_1 and R_1 with a different value for *n;*

2. R_1 and R_2 are selected from the group consisting of unsaturated hydrocarbon, aryl and substituted aryl residues;

3. R_1 represents the atoms of a polymeric structure in which case R_2 is selected from the group consisting of H and as defined in (1) and (2) above; and

M is selected from the group consisting of H, NH_4 and alkali metal cations; and

F. mixtures thereof.

3,888,679

POLYPROPYLENE SUPPORT FOR PHOTOGRAPHIC USE

Hajime Komatsu, Odawara, and Seio Mukai, Ichihara, both of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo and Chisso Corporation, Osaka, both of, Japan

Filed Jan. 28, 1974, Ser. No. 437,244

Claims priority, application Japan, Jan. 29, 1973, 48-11156; Jan. 29, 1973, 48-11157

Int. Cl. G03c *1/78;* **B44d** *1/22*

U.S. Cl. 96—87 R **9 Claims**

1. A polypropylene support for photographic use, comprising a main resin component of a polypropylene, together with 15 to 35% by weight of talc, 3 to 15% by weight of titanium white, and 0.1 to 5% by weight of a fatty acid metal salt, all the weight percents being based on the weight of said polypropylene support.

3,888,680

LIGHT-SENSITIVE SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL CONTAINING BIS-PYRAZOLONE COUPLERS

Mitsuto Fujiwhara; Keiji Kasai; Ryosuke Satoh; Yoshinobu Nakagawa, and Tuneo Tanigawa, all of Tokyo, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

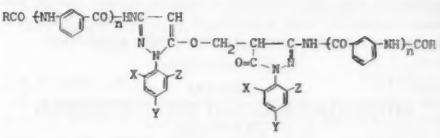
Continuation-in-part of Ser. No. 207,796, Dec. 14, 1971, abandoned. This application Dec. 26, 1973, Ser. No. 428,207

Claims priority, application Japan, Dec. 18, 1970, 45-113100

Int. Cl. G03c *1/40*

U.S. Cl. 96—100 **4 Claims**

1. A light-sensitive silver halide color photographic material containing a bis-type coupler of the general formula,



wherein R is an alkyl, aralkyl or aryl group; X, Y and Z are individually a hydrogen or halogen atom or an alkyl or alkoxy group having 1 to 4 carbon atoms, either one of said X and Z being necessarily a halogen atom; and *n* is zero or 1.

3,888,681

PROCESS FOR THE RAPID HARDENING OF GELATIN

Ikutaro Horie, and Kameji Nagao, both of Minami-Ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Filed Aug. 16, 1972, Ser. No. 281,095

Claims priority, application Japan, Aug. 23, 1971, 46-64134

Int. Cl. G03c *1/00;* **B44d** *1/44*

U.S. Cl. 96—111 **9 Claims**

1. A process for the rapid hardening of gelatin comprising coating a support with an aqueous gelatin solution containing as a hardener at least one of a halogenated diazine compound, a halogenated triazine compound, a compound having an active vinyl radical, a mucohalogen acid or a derivative thereof and a substituted or an unsubstituted 2,3-dihydroxy-1,4-dioxane, drying the coating at a constant rate for a period of time without irradiating and then after completion of the constant rate drying period, irradiating with high frequency microwaves.

3,888,682

ALGICIDAL POST TREATED ROOFING GRANULES

Arnold S. Nelson, Hagerstown, Md., assignor to GAF Corporation, New York, N.Y.

Filed Oct. 25, 1972, Ser. No. 300,852

Int. Cl. C09k *3/00*

U.S. Cl. 106—15 AF **30 Claims**

1. Algicidal roofing granules capable of inhibiting or preventing the growth of discoloring algae and fungi organisms upon exposure of roofing surfaces containing such granules to atmospheric weathering for extended periods of time, comprising:

a. base mineral granules;

b. a moisture permeable, durable, water insolubilized, pigmented, fired, inorganic alkali metal silicate-clay coating on said base granules;

c. a heavy processing oil composition present in an amount within the range of from about ¼ to about 1¼ gallons per ton of base granules, said processing oil forming a thin film on the surface of said coated granules, said process-

ing oil having a viscosity within the range of from about 525 to about 950 SUS, measured at 100°F; and

d. metallic algicides in the oil film and adhering to the surface of said granule coating, said algicides having a particle size not exceeding about 100 mesh and being present in amounts within the range of from about 0.05 to about 1.0 percent by weight based on the weight of the base mineral granules, metallic algicidal ions being leachable from said algicides upon exposure thereof to moisture during atmospheric weathering,

whereby the weathering away of said processing oil upon atmospheric exposure of roofing surfaces incorporating said granules does not adversely affect the enhanced adherence of said metallic algicides to said granule coating, the presence of moisture during periods of rain and dew causing ionization of said metallic algicides with the resulting metallic ions being slowly leached from said granules to retard the growth of algae and fungi, thus enhancing the resistance of said roofing surfaces containing such granules to discoloration during extended periods of exposure to atmospheric weathering.

3,888,683
NOVEL ALGICIDAL POST TREATED ROOFING GRANULES

John C. Horai, Jr., and David C. Little, both of Hagerstown, Md., assignors to GAF Corporation, New York, N.Y.

Filed Oct. 25, 1972, Ser. No. 300,853
Int. Cl. C09k *3/00*
U.S. Cl. 106—15 AF **25 Claims**

1. Algicidal roofing granules capable of inhibiting or preventing the growth of discoloring algae and fungi organisms upon exposure of roofing surfaces containing such granules to atmospheric weathering for extended periods of time, comprising:

a. base mineral granules;

b. a moisture permeable, durable, water insolubilized, pigmented, fired, inorganic alkali metal silicate-clay coating on said base granules;

c. a processing oil composition present in an amount within the range of from about ¼ to about 1½ gallons per ton of base granules, said processing oil forming a thin film on the surface of said coated granules, said processing oil having a viscosity within the range of from about 100 to about 500 SUS, measured at 100°F; and

d. copper silicate in the oil film and adhering to the surface of said granule coating, said copper silicate having a particle size not exceeding about 100 mesh and being present in amounts within the range of from about 0.05 to about 1.0 percent by weight based on the weight of the base mineral granules, metallic copper ions being leachable from said upon exposure thereof to moisture during atmospheric weathering, whereby the weathering away of said processing oil upon atmospheric exposure of roofing surfaces incorporating said granules does not adversely affect the enhanced adherence of said copper silicate to said granule coating, the presence of moisture during periods of rain and dew causing ionization of said copper silicate with the resulting metallic ions being slowly leached from said granules to retard the growth of algae and fungi, thus enhancing the resistance of roofing surfaces containing such granules to discoloration during extended periods of exposure to atmospheric weathering.

3,888,684
ALGICIDAL ROOFING GRANULES

David C. Little, Hagerstown, Md., assignor to GAF Corporation, New York, N.Y.

Filed Oct. 25, 1972, Ser. No. 300,876
Int. Cl. C09k *3/00*
U.S. Cl. 106—15 AF **10 Claims**

1. Algicidal roofing granules having an enhanced ability, over an extended period of time, to leach algicidal ions to prevent or inhibit the growth of discoloring algae and fungi organisms upon atmospheric exposure of roofing surfaces containing such granules, comprising

a. base mineral granules;

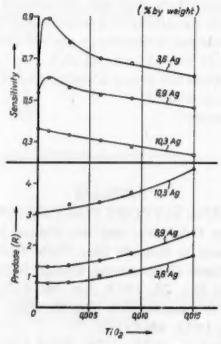
b. an inner, moisture permeable, durable, water insolubilized, pigmented, fired, inorganic alkali metal silicateclay coating, said coating containing a mixture of zinc and copper algicides; and

c. an outer, moisture permeable, durable, water insolubilized, pigmented, fired, inorganic alkali metal silicateclay coating, said coating containing a mixture of zinc and copper algicides, the total zinc algicidal content of said inner and outer coatings being in the range of from about 0.05 to about 0.5 percent by weight based on the total weight of said base granules, the total copper algicidal content of said inner and outer coatings being in the range of from about 0.05 to about 0.5 percent by weight based on the total weight of said base granules and the total algicidal content of said outer coating being less than that of said inner coating, whereby when said coated granules are incorporated into roofing compositions and exposed to atmospheric weathering algicidal ions are slowly leached from the outer coating during periods of rain and dew to retard the growth of algae and fungi, said inner coating serving as a reservoir of algicidal ions, thus assuring the continued leaching of algicidal ions from said granules during use over an extended period of time and assuring the effective utilization of the algicidal content of the overall granule coating, said inner coating also tending to fill in voids in the base mineral granules so as to assure a more uniform outer coating, enhancing the uniformity of the resistance of roofing surfaces containing said granules to discoloration during such extended periods of exposure to atmospheric weathering.

3,888,685
SENSITIZED, SILVER-ACTIVATED, PHOSPHORUS PENTOXIDE-CONTAINING RADIO-PHOTOLUMINESCENT GLASS AND PROCESS OF MAKING SAME

Hans-Herbert Kaes, Wetzlar; Dorlar, Germany, assignor to Ernst Leitz GmbH, Wetzlar, Germany

Filed Mar. 27, 1973, Ser. No. 345,368
Claims priority, application Germany, Apr. 1, 1972, 2216064
Int. Cl. C03c *3/26*
U.S. Cl. 106—47 R **10 Claims**



1. A sensitized, silver-activated, phosphorus pentoxide-containing radio-photoluminescent glass containing one of the elements selected from the group consisting of arsenic, zirconium, cerium, cesium, platinum, antimony, germanium, tin, hafnium, and titanium in a concentration of 0.0001 to 0.1 percent, by weight, calculated as oxide.

3,888,686
SEALING GLASS COMPOSITIONS CONTAINING CALCINED ZIRCONIA VANADIA SILICA STAIN

James L. Ellis, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Continuation of Ser. No. 831,648, June 6, 1969, abandoned. This application June 19, 1972, Ser. No. 277,457

Int. Cl. C03c *3/10, 3/30, 3/22*

U.S. Cl. 106—53 **4 Claims**

1. An improved thermally crystallizable fusion-type sealing glass composition of matter wherein said composition consists essentially of a base sealing glass selected from the group consisting essentially of lead-zinc-borate and lead-borosilicate sealing glasses and wherein said base sealing glass has homogeneously blended therein about 2 to 18 percent by weight of a calcined zirconia vanadia silica stain, said resulting fusion-type sealing glass having therby a thermal coefficient of expansion in the devitrified state ranging from about 5×10^{-7}/°C (0°–300°C) to 20×10^{-7}/°C (0°–300°C) lower than the same glass in the devitrified state would have in the absence of the calcined zirconia vanadia silica stain.

3,888,687
ALUMINA-CHROME REFRACTORY

Edward L. Manigault, Cincinnati, Ohio, assignor to The Chas. Taylor's Sons Co., Cincinnati, Ohio

Continuation-in-part of Ser. No. 402,090, Oct. 1, 1973. This application Mar. 4, 1974, Ser. No. 448,008

Int. Cl. C04b *35/10, 35/12*

U.S. Cl. 106—66 **8 Claims**

1. A ceramic composition, useful as a ramming mix, comprising 59 to 98% tabular alumina, 0 to 10% calcined alumina, 1 to 25% chromic oxide and 1 to 18% of a phosphate compound.

3,888,688
INORGANIC PIGMENTS AND PROCESS FOR THEIR PRODUCTION

Arno Broll, Rothenbergen, and Herbert Mann, Dornigheim, both of Germany, assignors to Deutsche Gold-und Silber-Scheideanstalt vormals Roessler, Germany

Filed Apr. 30, 1974, Ser. No. 465,560

Claims priority, application Germany, May 10, 1973, 2323481

Int. Cl. C08h *17/04*

U.S. Cl. 106—308 B **12 Claims**

1. An inorganic pigment having discrete particles of a colored chalcogenide of (1) cadmium, (2) zinc, (3) mercury or (4) of manganese, said particles being encased in a crystalline form of silicon dioxide, and where the chalcogen has an atomic weight of 32 and 79.

3,888,689
AQUEOUS PRINTING INK CONTAINING PERFUME-CONTAINING MICROCAPSULES

Yukio Maekawa; Shizuo Miyano; Kenichiro Yazawa, and Asaji Kondo, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 1, 1971, Ser. No. 185,492

Claims priority, application Japan, Oct. 1, 1970, 45-86239

Int. Cl. C09d *11/04, 11/14;* **C08f** *45/24*

U.S. Cl. 106—24 **14 Claims**

1. An aqueous phase comprising a printing ink containing perfumecontaining microcapsules comprising microcapsules dispersed in an aqueous solution of a polymer which is soluble in water but is less soluble in or swellable with an organic solvent, said microcapsules, each containing a single droplet of perfume and being produced by a conventional gelatin-polyanion complex coacervation process, the droplets of perfume having a size of from 15 to 70 microns and the amount of polymer, when dry, being less than twice the amount of the perfume, the polymer being one which does not deteriorate the gelatin-polyanion colloid coacervate of the microcapsules, wherein the aqueous phase contains a colored dye or pigment

and the water soluble polymer dissolved therein and the perfume containing microcapsules.

3,888,690
MOLD-RELEASE MATERIAL

Edward M. Geiser, Downers Grove, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Nov. 9, 1973, Ser. No. 414,547

Int. Cl. C04b *35/68*

U.S. Cl. 106—38.24 **4 Claims**

1. A mold-release composition comprising from about 50% to about 90% of a paraffinic oil, from about 20% to about 40% of an organic solvent, and from about 0.1% to about 10.0% of a salt of an amine, a dicarboxylic acid in a ratio of about 0.5 to about 2.0 equivalents of amine per 0.5 to about 4.0 equivalents of the acid, and about 0.5 to about 1.5 equivalents of an alkyl acid phosphate per 0.5 to about 1.5 equivalents of the acid and about 2.0 equivalents of the amine.

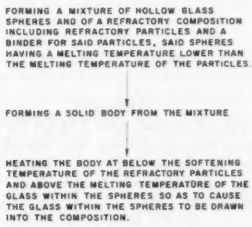
3,888,691
POROUS CERAMIC

Vincent Villani, Tujunga, and Ronald L. Topp, Poway, both of Calif., assignors to Lockheed Aircraft Corporation, Burbank, Calif.

Filed Oct. 6, 1972, Ser. No. 295,608

Int. Cl. C03c *11/00*

U.S. Cl. 106—40 V **4 Claims**


FORMING A MIXTURE OF HOLLOW GLASS SPHERES AND OF A REFRACTORY COMPOSITION INCLUDING REFRACTORY PARTICLES AND A BINDER FOR SAID PARTICLES, SAID SPHERES HAVING A MELTING TEMPERATURE LOWER THAN THE MELTING TEMPERATURE OF THE PARTICLES.
FORMING A SOLID BODY FROM THE MIXTURE
HEATING THE BODY AT BELOW THE SOFTENING TEMPERATURE OF THE REFRACTORY PARTICLES AND ABOVE THE MELTING TEMPERATURE OF THE GLASS WITHIN THE SPHERES SO AS TO CAUSE THE GLASS WITHIN THE SPHERES TO BE DRAWN INTO THE COMPOSITION.

1. An unfired porous ceramic composition having a comparatively high strength per unit of weight which comprises:

a plurality of hollow glass spheres surrounded by and held separate and apart from one another in and by a continuous matrix phase of ceramic particles which are bonded to one another by an inorganic binder so as to encase and surround said spheres,

both said spheres and said particles are no greater than about 4 mesh standard Tyler screen size in diameter and no smaller than about 200 mesh standard Tyler screen size.,

from about 40 to about 75 percent of said particles by volume are of one size and the remainder of said particles are of a size having at least half of the diameter of the larger particles,

from about 40 to about 75 percent of said spheres by volume are of one size and the remainder of said spheres are of a size having at least half of the diameter of the larger of said spheres,

said matrix consists essentially of from about 15 to about 30 percent by weight of said inorganic binder for said particles and the remainder of said particles,

said particles are irregularly shaped lithiumaluminum silicate particles having a melting temperature of at least 1,600°F,

said glass spheres have a melting temperature which is lower than the melting temperature of said particles,

said spheres constituting from about 30 percent to about 70 percent by volume of said body and constituting no more than about 50 percent by weight of the weight of said body,

said refractory particles being capable of taking up the material within said glass into their structures upon heating of said body to at least the melting temperature of said glass spheres.

3,888,692

FLINT OPTICAL GLASS

Shigeo Kuwayama, Odawara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Continuation-in-part of Ser. Nos. 182,876, Sept. 22, 1971, abandoned, and Ser. No. 33,500, April 30, 1970, abandoned, and Ser. No. 681,583, Nov. 8, 1967, abandoned. This application Aug. 21, 1973, Ser. No. 390,262

Claims priority, application Japan, Nov. 9, 1966, 41-73651

Int. Cl. C03c *3/04, 3/10, 3/30*

U.S. Cl. 106—53 **10 Claims**

1. A weather-proof, flint optical anastigmatic glass consisting essentially of on a percent by weight basis

from 12.5 to 19.5 percent SiO_2,

from 8.0 to 16.5 percent Al_2O_3,

from 12.0 to less than 20.0 percent B_2O_3

and from 42.0 to 60.0 percent PbO.

3,888,693

MULTI-PHASE RINSE AND RECOVERY METHOD

William Russell Schevey, Hawley, Pa.; Harold Freeman Jones, Dover, and Burton A. Spielman, Chatham, both of N.J., assignors to Allied Chemical Corporation, New York, N.Y.

Filed Mar. 20, 1972, Ser. No. 235,994

Int. Cl. B08b *3/08, 3/10*

U.S. Cl. 134—10 **51 Claims**

1. The method for removing a contaminating first liquid from a surface of an article which comprises

a. washing said surface with a second liquid having a different density than said first liquid, said first liquid being not over 10 percent by weight soluble in said second liquid;

b. simultaneously washing said surface with a third liquid comprising water which is miscible and soluble with, but not the same as, said first liquid and not over about 10 percent by weight soluble in said second liquid, said third liquid being present in a weight percent of said second liquid greater than the weight percent solubility of said third liquid in said second liquid and less than about four hundred percent by weight of said second liquid thereby displacing said first liquid from said surface, all liquids being substantially free from surface active agents;

c. collecting the displaced first liquid, the second liquid and the third liquid, subsequent to said washing, and causing said liquids to separate into a second liquid phase and a first and third liquid phase; and

d. recycling said first and third liquid phase as third liquid.

3,888,694

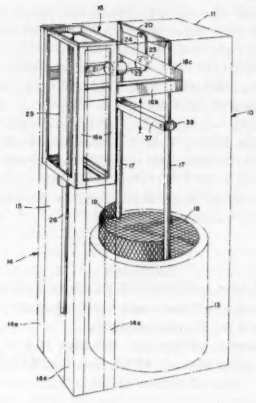
APPARATUS AND METHOD FOR CLEANING AIR FILTER ELEMENTS BY VERTICAL RECIPROCATION

Lee R. McKinney, P.O. Box 1182, Kalispell, Mont. 59901

Filed Apr. 26, 1973, Ser. No. 354,739

Int. Cl. B08b *3/10, 11/00*

U.S. Cl. 134—32 **9 Claims**



1. A method of cleaning a generally cylindrical air filter element having an enlarged opening at one end and being substantially closed at the opposite end thereof, said element also having an annular arrangement of longitudinally and radially extending folds of porous filter paper, comprising the steps of totally immersing said filter element in a body of cleaning liquid with the axis of said element extending generally vertically and with the enlarged end opening of said element facing downwardly and the sustantially closed opposite end facing upwardly, and thereafter axially reciprocating said element within said liquid at a frequency of approximately 100 to 400 cycles per minute and with a vertical stroke length within the range of 0.5 to 4 inches.

3,888,695

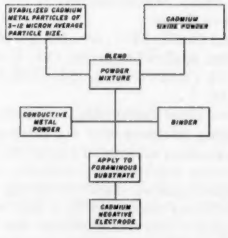
RECHARGEABLE CELL HAVING IMPROVED CADMIUM NEGATIVE ELECTRODE AND METHOD OF PRODUCING SAME

Henry A. Catherino, Gainesville, Fla., assignor to General Electric Company, Owensboro, Ky.

Division of Ser. No. 275,086, July 25, 1972. This application Nov. 23, 1973, Ser. No. 418,366

Int. Cl. H01m *43/04*

U.S. Cl. 136—24 **3 Claims**



1. An improved rechargeable cell having enhanced antifading and energy-density properties comprising:

a. an alkali-electrolyte resistant container having at least one insulated terminal thereon;
b. a positive electrode;
c. an alkali electrolyte; and
d. a cadmium negative electrode comprising a mixture of stabilized, generally spherically shaped cadmium metal particles formed by condensing cadmium metal vapors in the presence of oxygen, said particles having an average particle size of about 3–12 microns and cadmium oxide powder in a binder and applied to a foraminous substrate.

3. A method of making an improved rechargeable cell having enhanced anti-fading and energy-density properties comprising:

a. constructing a positive electrode containing, in an uncharged state, a predetermined amount of electrochemically active material corresponding to the desired capacity of the cell;
b. constructing a cadmium negative electrode by applying to a foraminous substrate a mixture of
1. generally spherically shaped cadmium metal particles formed by condensing metal vapors in the presence of oxygen and having an average particle size of about 5–10 microns, in an amount sufficient to replenish active negative plate material which may become electrochemically inactive during operation of the cell;
2. cadmium oxide powder in an amount at least approximately equal electrochemically to the amount of uncharged positive material;
3. a suitable binder;
c. assembling the electrodes together into a container;
d. adding an electrolyte;
e. sealing the container; and
f. thereafter charging the cell.

3,888,696

ELECTROCHEMICAL SYSTEMS EMPLOYING ORGANIC ELECTROLYTIC SOLVENTS

Morris Eisenberg, Mountain View, Calif., assignor to Electrochimica Corporation, Mountain View, Calif.

Continuation-in-part of Ser. No. 173,253, Aug. 19, 1971. This application Aug. 13, 1973, Ser. No. 387,679
Int. Cl. H01m *11/00*
U.S. Cl. 136—83 R **7 Claims**

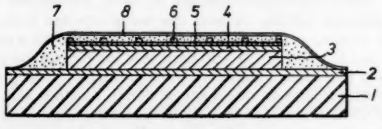
1. An electrochemical system comprising an anode including a metal less noble than zinc; a cathode including a halide of a metal selected from the group consisting of copper, nickel, silver, cobalt and iron; and an electrolyte for electrolytic conduction between said anode and cathode, said electrolyte comprising a solute dissolved in a solvent comprising at least 50 percent by volume nitromethane and between 10 and 50 percent by volume nitroethane.

3,888,697

PHOTOCELL

Klaus Bogus, Horkheim, and Siegfried Mattes, Heilbronn-Bockingen, both of Germany, assignors to Licentia-Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Oct. 16, 1972, Ser. No. 297,703
Claims priority, application Germany, Oct. 23, 1971, 2152895; Oct. 23, 1971, 7140208
Int. Cl. B44d *1/18;* **H01l** *15/02*
U.S. Cl. 136—89 **17 Claims**



1. A thin layer photocell comprising a semiconductor body of cadmium sulphide, a layer of cuprous sulphide on said cadmium sulphide body, and an additional layer of metallic copper arranged on said cuprous sulphide layer, said additional layer of copper being thin in relation to said cuprous sulphide layer.

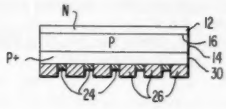
4. A method of producing a thin layer photocell comprising the steps of forming a layer of cuprous sulphide on the surface of a semiconductor body of cadmium sulphide and forming an additional layer of copper, which additional layer is thin in relation to said cuprous sulphide layer, on said cuprous sulphide layer.

3,888,698

INFRARED-TRANSPARENT SOLAR CELL

Joseph Lindmayer, Bethesda; Denis John Curtin, Rockville; Joseph Gabriel Haynos, and Andrew Meulenberg, Jr., both of Gaithersburg, all of Md., assignors to Communications Satellite Corporation, Washington, D.C.

Filed Nov. 9, 1972, Ser. No. 305,030
Int. Cl. H01m *29/00*
U.S. Cl. 136—89 **14 Claims**



1. A solar cell of the type comprised of at least two layers of semiconductor material of opposite type conductivity defining a p-n junction, the surface of one layer opposite said p-n junction being substantially closer to said p-n junction that the surface of said other layer opposite said p-n junction, the said surface of said one layer being the upper surface of said solar cell and being adapted to receive incident light, the said surface of said other layer being the bottom surface of said solar cell, said upper surface having an electrode configuration thereon through which light can pass to said top surface and into said semiconductor layers, the improvement comprising an electrode on said bottom surface formed in a pattern over said surface covering less than 10 percent of said bottom surface, and a layer of material covering at least those portions of said bottom surface not covered by said electrode, said latter mentioned layer of material being an electrical insulator and having an optical index of refraction intermediate that of the optical indeces of refraction for said semiconductor material and space wherein said electrode on said bottom surface pattern comprises a plurality of fine lines of metal interconnected by other metal lines terminating in larger metallic areas adapted for connecting said back electrode to external circuitry.

3,888,699

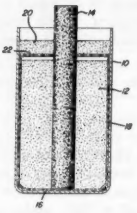
PRIMARY DRY CELL

Lewis F. Urry, North Olmsted, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Continuation of Ser. No. 59,272, July 29, 1970, abandoned. This application Aug. 27, 1973, Ser. No. 391,611
Int. Cl. H01m *21/00*
U.S. Cl. 136—107 **3 Claims**

1. A primary dry cell comprising a zinc anode, a cathode depolarizer mix cake containing manganese dioxide, a conductive material and an inner electrolyte consisting essentially

of an aqueous zinc perchlorate solution, and a separator interposed between said anode and said cathode depolarizer mix



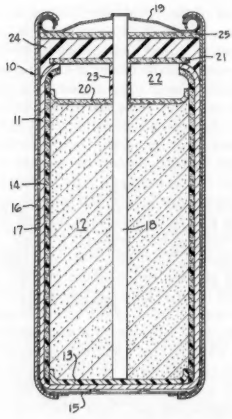
cake, said inner electrolyte constituting from about 60 to 71 percent by volume of the total cathode depolarizer mix cake.

3,888,700

ABSORBENT SEPARATOR FOR AN ELECTRIC BATTERY

Duane M. Larsen, Madison, Wis., assignor to ESB Incorporated, Philadelphia, Pa.

Filed Nov. 1, 1968, Ser. No. 772,775
Int. Cl. H01m *3/02*
U.S. Cl. 136—146 **14 Claims**



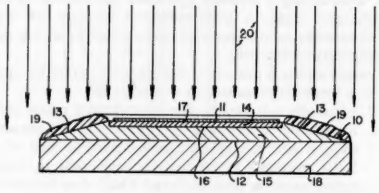
1. An electric battery having an anode, a cathode mix comprising a depolorizer and an aqueous electrolyte solution, and an absorbent separator sheet material between said anode and cathode, said absorbent separator consisting essentially of an elastomeric resin binder forming a continuous matrix blended with a gelling agent capable of absorbing and retaining battery electrolyte, said elastomeric resin binder comprising from about 10 to about 30 percent by weight of the separator with the balance being gelling agent, said binder and gelling agent being dry blended whereby the gelling agent is not gelled, and said separator being in the form of a film having a thickness from about 3 to about 15 mils.

3,888,701

TAILORING REVERSE RECOVERY TIME AND FORWARD VOLTAGE DROP CHARACTERISTICS OF A DIODE BY IRRADIATION AND ANNEALING

Krishan S. Tarneja, and John Bartko, both of Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 9, 1973, Ser. No. 339,669
Int. Cl. H01l *7/54*
U.S. Cl. 148—1.5 **6 Claims**



1. A method of tailoring reverse recovery time and forward voltage drop characteristics of a diode comprising the steps of:

A. positioning a diode semiconductor body with given first reverse recovery time and first forward voltage drop values with a major surface thereof for exposure to a radiation source;

B. increasing the forward voltage drop to a second forward voltage drop value below a desired value and decreasing the reverse recovery time to a second reverse recovery time value below a desired value by irradiating the positioned diode semiconductor body with the radiation source; and

C. decreasing the forward voltage drop to a third desired forward voltage drop value and increasing the reverse recovery time to a third desired reverse recovery time value below said first reverse recovery time value by annealing the irradiated diode semiconductor body.

3,888,702

HYDROGEN PEROXIDE TREATMENT OF NICKEL SURFACES FOR SILICONE RUBBER BONDING

Richard J. Kujawa, Kokomo, and Rebecca A. Swails, Greentown, both of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 19, 1973, Ser. No. 417,423
Int. Cl. C23f *5/02*
U.S. Cl. 148—6.14 R **1 Claim**

1. A highly controllabel method for treating nickel surfaces before bonding silicone rubber thereto, that consistently and reliably enhances adhesion of the silicone rubber to the nickel surfaces, which method includes use of a room temperature, low concentration aqueous hydrogen peroxide solution that is insensitive to phosphate ion contamination up to 15 parts per million, said method comprising the steps of immersing said nickel surface in a substantially lead-free and generally room temperature solution consisting essentially of water and about 10% – 20 % by weight hydrogen peroxide, introducing into said aqueous solution at least one metal selected from the group consisting of pure lead and lead alloys in an amount sufficient to produce 0.5 – 20 parts lead ion per million parts solution to initiate a moderate decomposition of said hydrogen peroxide and an attendant moderate reaction with the nickel surface on said bodies, allowing said decomposition and reaction to proceed until substantially all of the hydrogen peroxide has decomposed, rinsing said nickel surfaces, and drying them.

3,888,703
METHOD OF PRODUCING CREEP RESISTANCE OF PB-B ALLOYS

Milton M. Tilman; Robert L. Crosby, and Leander A. Neumeier, all of Rolla, Mo., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed May 22, 1974, Ser. No. 472,388
Int. Cl. C22c *11/00*
U.S. Cl. 148—11.5 R **5 Claims**

1. A method for treatment of lead-antimony alloys, containing up to about 5 percent antimony, comprising (1) breakdown deformation of the alloy with reductions per pass greater than about 10 percent for a total reduction of at least about 67 percent of the original thickness and (2) finish deformation of the alloy at a temperature of about 100° to 200°C and with reduction per pass less than 10 percent.

3,888,704
METHODS OF TREATING HARDENING OIL BEFORE USE BY ADDING A MIXTURE OF ETHOXYLATED ACYCLIC COMPOUNDS AND FILM-FORMING ACYCLIC COMPOUNDS

Per Olof Lindstedt, Molndal, Sweden, assignor to Olof Lindstedt & Co. AB, Molndal, Sweden

Filed Feb. 20, 1974, Ser. No. 444,223
Int. Cl. B23k *35/24*
U.S. Cl. 148—29 **5 Claims**

1. A method of improving a mineral oil-based oil for use in cooling metallic objects by rapidly immersing said objects in said oil, said method comprising adding to said oil 1–10 percent, by weight of said oil, of a mixture consisting of:

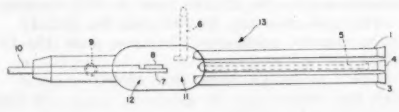
A. 60–95 percent by weight of an emulsifier, said emulsifier being a biodegradable, ethoxylated, acyclic compound selected from the group consisting of esters, alkyl ethers, fatty acid amides and alkylamine-ethylene oxide adducts, wherein said compound contains 8–20 carbon atoms in alkyl groups and 2–15 hydrophilic, ethylene oxide units; and

B. 40–5 percent by weight of a C_{10}–C_{26}, film-forming, acyclic compound selected from the group consisting of esters, alcohols, amides and amines, said film-forming compound being neither soluble in nor dispersible by water.

3,888,705
VAPOR PHASE GROWTH OF GROUPS III-V COMPOUNDS BY HYDROGEN CHLORIDE TRANSPORT OF THE ELEMENTS

James C. Fletcher, Administrator of the National Aeronautics and Space Administration in respect to an invention of; Ramesh C. Tyagi, Delhi, India; William J. Debnam, Jr., Hampton, Va.; Maxwell F. McNear, Hampton, Va.; Roger K. Crouch, Hampton, Va., and Roger A. Breckenridge, Newport News, Va.

Filed Dec. 19, 1973, Ser. No. 426,405
Int. Cl. H01l *7/36;* **C23c** *11/00*
U.S. Cl. 148—175 **6 Claims**



1. A method of forming binary, ternary, and quaternary compounds derived from elements of Group III and Group V, which consists essentially of the steps of:

a. passing a carrier gas consisting of hydrogen and hydrogen chloride, containing 1% to 10% of hydrogen chloride by volume separately over two to four elements of Group III and Group V, at least one of said elements being a Group III element and one being a Group V element, said elements being in separate source tubes and kept at a temperature below their sublimation temperature or boiling points, but at a temperature sufficient for their reaction with the hydrogen chloride, whereby the elements combine with the hydrogen chloride to form the corresponding sub-chlorides such that essentially no unreacted hydrogen chloride remains; and

b. transporting the sub-chlorides obtained in (a) to a deposition zone containing a single crystal substrate derived from at least one Group III element and one Group V element whereby the elements deposit on the substrate, with the rate of flow of carrier gas over each of the elements being adjusted so that the elements are deposited on the substrate in sufficient amounts to provide a binary, ternary, or quaternary compound consisting of elements of Group III and Group V.

3,888,706
METHOD OF MAKING A COMPACT GUARD-BANDED MOS INTEGRATED CIRCUIT DEVICE USING FRAMELIKE DIFFUSION-MASKING STRUCTURE

Andrew Gordon Francis Dingwall, Somerville, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Aug. 6, 1973, Ser. No. 385,668
Int. Cl. H01i *7/44*
U.S. Cl. 148—187 **12 Claims**

1. A method of making an integrated circuit device including an insulted gate field effect transistor, from a body of semiconductive material having a surface, comprising the steps of

forming on said surface a diffusion-masking, framelike structure which has sides of predetermined width and a crossbar of predetermined width whereby two openings are defined therein, said framelike structure comprising a gate insulator layer on said surface of said body, a refractory conductor layer on said gate insulator layer, and an oxygen-impermeable layer on said conductor layer,

diffusing conductivity modifiers into said body through the surface portions thereof within the two openings in said framelike structure to form spaced diffused regions in said body,

diffusing conductivity modifiers into said body through surface portions outside and immeditely adjacent said framelike structure, and

removing portions of at least the conductor layer and the oxygen-impermeable layer in said framelike structure to leave on said surface at least those portions of said layers located in the crossbar of said framelike structure.

3,888,707
FLEXIBLE, SELF-SUPPORTING EXPLOSIVE COMPOSITION

Julius Rothenstein, Sacramento, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 20, 1972, Ser. No. 243,504
Int. Cl. C06b *15/02;* **C06d** *5/06*
U.S. Cl. 149—19.4 **10 Claims**

1. A castable composition for forming a self-supporting, thermally stable, flexible explosive comprising 60-85 weight percent of fine particulate explosive filler selected from organic nitrates and organic nitramines dispersed in a binder formed of a low temperature curable liquid prepolymer of the formula

I. $$\begin{array}{c}\text{Y–R–Y}\\ |\\ \text{Y}_n\end{array}$$

and a coupling curing agent of the formula

$$Z—R^2—(Z)_m \text{ (II)}$$

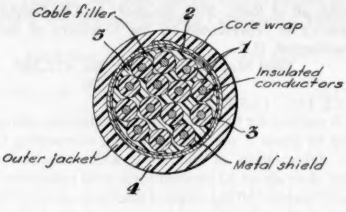
where n is an integer from 0 to 4, m is an integer of at least 2, R is an organic moiety having a molecular weight from 1,000 to 15,000, R^2 is an organic radical containing 2–50 carbon atoms and Z and Y are coreactive, condensible groups, capable of reaction to form ZY links which chain extend and crosslink the liquid prepolymer to form a continuous, flexible, thermally stable, high tensile strength explosive composition with high detonation velocity and low critical thickness, wherein Y is selected from the group consisting of thiol, hydroxyl, isocyanate, epoxy and amine and Z is a group coreactive and condensible with Y selected from the group consisting of isocyanate, carboxyl, amine, anhydride, hydroxyl or epoxy.

3,888,708
METHOD FOR FORMING REGIONS OF PREDETERMINED THICKNESS IN SILICON
Kensall D. Wise, 965 Buckeye Crt., Sunnyvale, Calif. 94086, and Samaun, Bandung Institute of Technology, Djl. Ganeco 10, Bandung, Indonesia
Continuation of Ser. No. 227,027, Feb. 17, 1972, abandoned. This application Apr. 10, 1974, Ser. No. 459,713
Int. Cl. H01l *7/50*
U.S. Cl. 156—11 **5 Claims**

1. A method of etching thin regions of predetermined thickness in a silicon body by use of an anisotropic etchant which comprises the steps of forming a silicon body with its (100) crystallographic plane extending parallel to opposite faces of the body, applying a layer resistant to the etchant to each of the opposite faces, removing a portion of said resistant layer from one face to form a slot of predetermined width in said layer to expose the underlying silicon, removing portions of the resistant layer from the opposite face in areas where the thin region of predetermined thickness is to be formed including removal of the resistant layer directly opposite said slot, subjecting the silicon body to said anisotropic etchant to remove silicon from the exposed areas on both faces, said etchant serving to form a groove of predetermined depth at said slot of predetermined width and quenching the etch when the silicon is removed to an extent that the etched opposite surface reaches the bottom of the groove.

3,888,709
CABLE FILLING COMPOUNDS
William R. Burk, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.
Filed May 10, 1974, Ser. No. 468,776
Int. Cl. H01b *13/00*
U.S. Cl. 156—48 **7 Claims**

1. A filling composition for electrical cables and devices, which composition comprises a major proportion of low density polyethylene constituent A and a minor proportion of low density polyethylene constituent B, which constituent A has melt flow rate value from about 5 to about 140 dg/min when measured by ASTM D–1238-70 at 50°C and 2,160 g total load using 0.0200 inch die orifice and which constituent B has melt flow rate value from about 0.2 to about 250 dg/min when measured by ASTM D–1238-70 at 190°C and 2,160 g total load using 0.0825 inch die orifice, the composition being a melt blended mixture of the constituents A and B and having



melt flow rate value from about 0.1 to about 25 dg/min when measured by ASTM D–1238-70 at 50°C and 2,160 g total load using 0.0200 inch die orifice.

3,888,710
PROCESSING CABLE FILLING COMPOUNDS
William R. Burk, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.
Filed May 10, 1974, Ser. No. 468,775
Int. Cl. H01b *13/00*
U.S. Cl. 156—48 **8 Claims**

8. In the manufacture of filled telecommunication cables by cold filling process wherein a plurality of insulated conductors are brought together and arranged to form a cable core bundle defining interstices and disposing in such interstices a cable filler compound at nearly ambient temperature whereby the resulting cable core is substantially filled with substantially solid material which resists flowing from the cable at temperatures below about 70°C, and wherein the filler compound is a blend comprising from about 89 to about 95 percent of low density polyethylene constituent A and from about 5 to about 11 percent of low density polyethylene constituent B, based on the combined weights of such constituents A and B, which constituent A has melt flow rate from about 25 to about 35 dg/min when measured by ASTM D-1238-70 at 50°C and 2,160 g total load using 0.0200 inch orifice die and which constituent B has melt flow rate from about 20 to about 50 dg/min when measured by ASTM D-1238-70 at 190°C and 2,160 g total load using 0.0825 inch orifice die, and the blend thereof having melt flow rate from about 1 to about 5 dg/min when measured by ASTM D-1238-70 at 50°C and 2,160 g total load using 0.0200 inch orifice die, the improvement which comprises quickly cooling the filler compound from a temperature of at least about 135°C to a temperature of at most about 75°C in a time not more than about five minutes, and thereafter disposing the resulting compound in the interstices of the cable core.

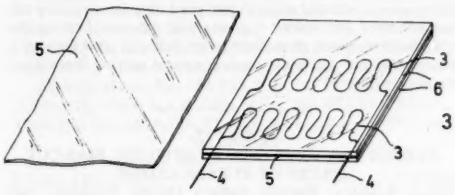
3,888,711
METHOD OF APPLYING METAL FILAMENTS TO SURFACES
Wilhelm Breitner, Bopser-Strasse 7, Stuttgart, Germany
Continuation of Ser. No. 154,586, June 18, 1971, abandoned. This application Aug. 28, 1973, Ser. No. 392,247
Claims priority, application Germany, June 19, 1970, 2030204
Int. Cl. B32b *17/04, 17/10*
U.S. Cl. 156—93 **9 Claims**

1. A method for producing a transparent glass sheet of a predetermined shape having an open transparent network of metallic filaments combined therewith, comprising the steps:

a. intertwining a plurality of metallic filaments in a transparent wavy pattern with electrically insulating fusible filaments by a technique other than weaving;

b. connecting said metallic filaments with a main electrical conductor;

c. stabilizing the metallic and insulating filaments by joining them together by means of a slight fusion of the insulating filaments with the metallic filaments at their junctions to form an open transparent stabilized self-supporting network;
d. shaping the stabilized self-supporting network to match with the shape of said glass sheet;



e. applying said network to a transparent plastic sheet and fusing the network into said plastic sheet to render said insulating filaments invisible;
f. fastening said plastic sheet containing the fused network to the surface of said sheet of glass.

3,888,712

METHOD FOR PRODUCING FIBERGLASS REINFORCED PLASTIC COMPOSITE PIPES

Katsumi Akiyoshi; Yukimasa Terui; Hitoshi Kirigaya, and Haruo Koyama, all of Tokyo, Japan, assignors to Bridgestone Tire Company Ltd., Tokyo, Japan

Filed Feb. 15, 1973, Ser. No. 332,758

Claims priority, application Japan, Feb. 22, 1972, 47-17725; Feb. 22, 1972, 47-17726; June 22, 1972, 47-62719

Int. Cl. B65h *81/02, 81/06*

U.S. Cl. 156—171 **11 Claims**

1. A method for producing fiber glass reinforced plastic composite pipes comprising the steps of
winding glass fiber threads impregnated with a thermosetting resin on a mandrel to form an inner tube,
applying a resinous concrete to said inner tube and of
again winding glass fiber threads impregnated with a thermosetting resin, said layer thus forming an outer layer,
characterized in that the intermediate layer is formed by winding a sheet consisting of a resinous concrete, said sheet being prepared by thickening a mixture of
a. 100 parts of an unsaturated polyester resin,
b. 0.5 to 10 parts of an inorganic thickener selected from the group consisting of magnesium oxide, calcium oxide, calcium hydroxide, beryllium oxide and mixture thereof,
c. 0.1 to 5 parts of a cross-linking agent,
d. 0 to 5 parts of a cross-linking accelerator,
e. 100 to 900 parts of a filler, and
f. 0 to 30 parts of a diluting agent
at a temperature of 10°to 60°C and extruding the thickened mixture into the sheet.

3,888,713

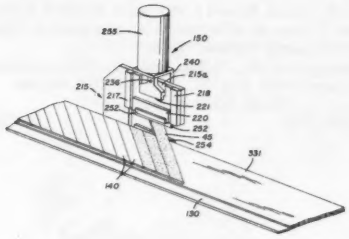
METHOD FOR PRODUCING REINFORCED FABRIC

Sterling W. Alderfer, Akron, Ohio, assignor to The Steelastic Company, Akron, Ohio

Division of Ser. No. 256,472, May 24, 1972, Pat. No. 3,803,965. This application Jan. 11, 1974, Ser. No. 432,692

Int. Cl. B32b *7/08*

U.S. Cl. 156—93 **7 Claims**



1. A method for fabricating reinforced elastomeric material comprising the cyclic steps of: encapsulating a reinforcement within a narrow ribbon of uncured, elastomeric material; orienting said reinforced ribbon on the first table of a bias cutting apparatus; engaging a length of said reinforced ribbon with a reciprocable shuttle head; transferring the support for said length of reinforced ribbon from said first table to the reciprocable shuttle head; vertically separating said length of reinforced ribbon, supported by the reciprocable shuttle head, from the first table; translating said length of reinforced ribbon, supported by the reciprocable shuttle head, past means for severing said reinforced ribbon to position a predetermined length of said reinforced ribbon over a second table; accurately depositing said predetermined length of said reinforced ribbon onto the second table of a bias cutting apparatus in contiguous juxtaposition with a previously deposited predetermined length of reinforced ribbon; and, severing the predetermined length of said reinforced ribbon.

3,888,714

FIBER REINFORCED TUBULAR ARTICLE HAVING ABRASION RESISTANT LINER

James T. Fiser; Robert M. Jackman, and Ray R. James, all of Little Rock, Ark., assignors to A. O. Smith-Inland, Inc., Milwaukee, Wis.

Division of Ser. No. 250,767, May 5, 1972, Pat. No. 3,697,346. This application Sept. 11, 1973, Ser. No. 396,233

Int. Cl. B65h *81/00*

U.S. Cl. 156—171 **9 Claims**

1. The method of forming a tubular article having an inner liner resistant to abrasion, corrosion, and erosion including the steps of applying a fibrous material and a resin to a supporting surface, applying abrasion resistant particles to the fibrous material, maintaining the resin and particles in a con-

fined tubular condition to form the inner liner, applying fibrous filaments impregnated with thermosetting resin over the confined resin and particles, and curing the entire composite forming the tubular article.

3,888,715

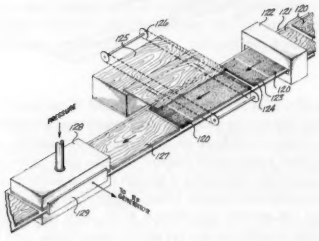
METHOD OF INDUCING HIGH FREQUENCY ELECTRIC CURRENT INTO A THERMOSETTING ADHESIVE JOINT

Richard S. Fraser, Los Angeles, Calif.; Cecil J. Allison, Jr., Richard W. Caster, Ronald J. McConnel, Robert E. Kribich, and Paul Y. Jone, all of Seattle, Wash., assignors to Weyerhaeuser Company, Tacoma, Wash.

Continuation of Ser. No. 73,926, Sept. 21, 1970, abandoned. This application Aug. 27, 1973, Ser. No. 391,706

Int. Cl. B32b *21/04, 31/20*

U.S. Cl. 156—273 **19 Claims**



1. The process of bonding members with a thermosetting adhesive in a heat generating, dielectric, radio frequency field comprising:

locating a multiplicity of spaced apart, patterned field control elements within the glueline area between the members, said elements having a conductivity different from the adhesive and said pattern being a series of parallel stripes;

placing the members between the electrodes of the dielectric heat generator; and

applying the dielectric field parallel to the plane of the glueline area and perpendicular to the direction of the stripes for a time at least sufficient to induce bonding in the areas between the stripes.

3,888,716

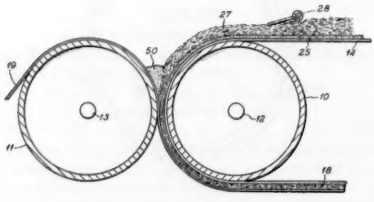
PREPARATION OF RESIN IMPREGNATED GLASS FIBER SHEETS

Donald B. Morse, Joliet, Ill., assignor to Kemlite Corporation, Joliet, Ill.

Filed June 5, 1972, Ser. No. 259,846

Int. Cl. B32b *31/12*

U.S. Cl. 156—276 **9 Claims**



1. A method of preparing a resin impregnated glass fiber sheet comprising depositing a layer of liquid thermosetting resin on a flexible film, depositing reinforcing glass fibers on the surface of said resin layer to form a structure in which a layer of intertangled glass fibers is held to said film by said resin, passing said structure along with a second film through the nip of a pair of spaced rolls with the film of said structure in contact with the surface of one of said rolls and said second film in contact with the surface of the other of said rolls and with said resin and glass fibers between said films, controlling the rate at which said resin is deposited on said first mentioned film with respect to the rate at which said resin is passed through said nip to provide and maintain a pool of liquid resin in advance of said nip and between said films, said structure being passed into and through said pool after the structure has been formed and before it passes said nip, and heating the combined resin and glass fibers to set the resin after they have passed said nip and while supporting and moving them away from said rolls.

3,888,717

SYSTEM FOR SUCCESSIVELY SPLICING BIAS-CUT PIECES OF RUBBER CLOTH

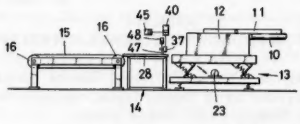
Masao Koyama, Hatano; Noboru Okada, Fujisawa, and Masahiro Ogawa, Hiratsuka, all of Japan, assignors to The Yokohama Rubber Co., Ltd., Japan

Filed Sept. 21, 1973, Ser. No. 399,601

Claims priority, application Japan, Nov. 24, 1972, 47-118260

Int. Cl. B32b *31/10;* **G05g** *15/00*

U.S. Cl. 156—351 **10 Claims**



1. In a system for successively splicing parallelogram-shaped pieces of rubber cloth together, comprising in combination:

a vibrating conveyor onto which the pieces of rubber cloth of specified shape and size are supplied successively with a selected spacing from one to the next, said vibrating conveyor including: a trough; a guide plate formed along one edge of said trough, and means for imparting vibration to said trough whereby each of the successive pieces of rubber cloth is fed along said guide plate with one edge thereof in sliding contact with said guide plate into position for the splicing action; a splicer for joining the successive pieces of rubber cloth end to end, said splicer including: a table mounted in the direction of the splicing action from said vibrating conveyor and closely spaced therefrom so as to receive the successive pieces of rubber cloth from the vibrating conveyor; an elongate stop supported horizontally above said table for arresting the motion of each of the successive pieces of rubber cloth in a first position on said t. ble; means for moving said stop up and down; a hollow suction arm supported horizontally above said table in side-by side relationship to said stop so as to be in registration with the leading edge of said each piece of cloth in said first position on said table, means communicating with said suction arm for creating a selected vacuum therein whereby the leading edge of said each piece of rubber cloth can be releasably adhered to said suction arm by suction exerted through at least one aperture formed at its bottom; means for moving said suction arm up and down independently of said stop; and means for moving said suction arm back and forth in the direction of the movement of the pieces of rubber cloth from said conveyor to said table so that the leading edge of said each piece of rubber cloth releasably adhered to said suction arm when the latter is in its depressed position is thereby elevated, carried forwardly over said table, and pressed down onto the trailing edge of the preceding piece of rubber cloth which has been held standing by in

a second position on said table; and a take-up conveyor for carrying the spliced pieces of rubber cloth away from under such suction arm and said stop over a distance corresponding to the length of each piece of rubber cloth upon completion of each splicing operation.

3,888,718

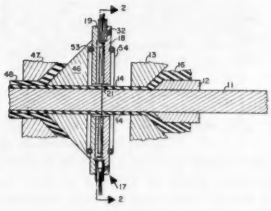
APPARATUS FOR APPLYING A DUAL EXTRUSION OVER A CABLE CONDUCTOR

Edwin H. Arnaudin, Jr., Marion; Wilbert W. Christiansen, Indianapolis, and Robert I. Hazelett, Jr., Marion, all of Ind., assignors to The Anaconda Company, New York, N.Y.

Division of Ser. No. 164,543, July 21, 1971, Pat. No. 3,746,575, which is a division of Ser. No. 873,811, Nov. 4, 1969, Pat. No. 3,626,196. This application Mar. 6, 1973, Ser. No. 338,720

Int. Cl. H01b *13/14;* **B29t** *3/10*

U.S. Cl. 156—356 **1 Claim**



1. Apparatus for applying a dual extrusion over a cable conductor comprising:

A. first die means continuously extruding a first layer of semiconducting polymeric material over said conductor,

B. a first plurality of optical fibers radially disposed around said conductor downstream of said die means,

C. means illuminating said conductor through said fibers,

D. a second large plurality of optical fibers radially disposed around said conductor so as to receive said illumination reflected from said conductor through any holidays in said coating said second plurality of optical fibers being axially displaced from said first plurality of optical fibers and said first and second pluralities of optical fibers being disposed in a plurality of planes wherein each of said planes is parallel to the conductor axis and includes the conductor axis,

E. sensing means communicating with said second plurality of fibers for sensing holidays in said coating, and

F. second die means downstream of said fibers for continuously extruding a second layer of polymeric material over said first layer.

3,888,719

ADJUSTABLE VACUUM PRESS

David A. Gibbs, Waban, Mass., and Donald N. Humphries, Oxford, Conn., assignors to Seal Incorporated, Derby, Conn.

Filed Apr. 10, 1973, Ser. No. 349,719

Int. Cl. B30b *15/34*

U.S. Cl. 156—378 **11 Claims**

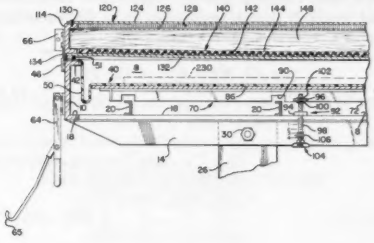
11. A vacuum press comprising a platen assembly, a horizontal work support assembly below said platen assembly, and means hingedly connecting said platen assembly to said base so that said platen assembly is movable into and out of engagement with said work support assembly;

said platen assembly including a first frame, a flexible metal platen supported only at its edges by said first frame, and electrical heater means for heating said platen;

said work support assembly including a second frame, leg means attached to and supporting said second frame, and a flexible air-impermeable sheet mounted at its edges to said second frame, said sheet drooping between its edges;

said platen assembly and said work support assembly when engaged providing an air-tight work-receiving chamber therebetween with said platen and flexible sheet forming opposite side walls of said chamber;

means for evacuating said chamber so that the atmospheric pressure exterior of said chamber will force said flexible sheet toward said platen and thereby compress a workpiece supported on said sheet;



control means for operating said electrical heater means and said evacuating means so that a workpiece in said chamber is both heated and compressed;

a vertically movable platform located below said flexible sheet for supporting at least part of the drooping portion of said sheet; and

means connected to said second frame for supporting and vertically moving said platform so as to vary the height at which the drooping portion of said sheet is supported by said platform.

3,888,720

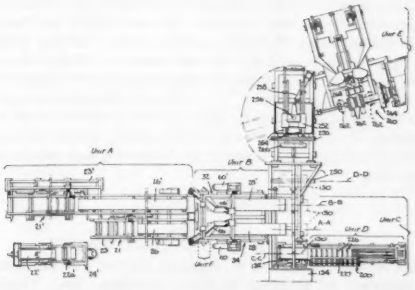
TIRE BUILDING MACHINE HAVING A VARIABLE DIAMETER TIRE BUILDING DRUM

William C. Habert, Fraser, Mich., assignor to Uniroyal, Inc., New York, N.Y.

Filed Feb. 5, 1973, Ser. No. 329,786

Int. Cl. B29h *17/16*

U.S. Cl. 156—414 **32 Claims**



1. A tire building drum for the building of a tire of a selected diameter from within a range of diameters comprising

a plurality of arcuate segments forming the circumferential periphery of the drum, said arcuate segments being radially movable with respect to the longitudinal axis of rotation of the drum, each segment extending axially for the entire axial width of the drum, the segments being arranged circumferentially adjacent one another to form a substantially continuous rigid surface;

and drive means for uniformly radially moving all the segments simultaneously to the selected diameter, said drive means comprising a cam means having a single continu-

ous spiral operatively, connected with each segment, each segment having a radially inward extending leg of a different length and a cam follower engaging the spiral cam means at different radial locations in the spiral to maintain the segmented drum with a uniform circumference.

3,888,721

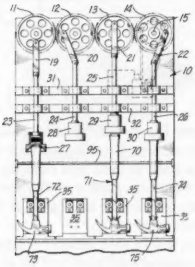
APPARATUS FOR ATTACHING FIBERGLASS HANDLES

Joseph Allen Carmien, Beverly Hills; Elbert Davis, Glendale, and Roger G. Cervi, Inglewood, all of Calif., assignors to Nupla Corporation, Sun Valley, Calif.

Filed May 28, 1974, Ser. No. 473,725

Int. Cl. B29d *3/00;* **C72b** *3/00*

U.S. Cl. 156—423 **10 Claims**



1. An apparatus for making a fiberglass connection of the type in which one end of an elongated handle is mounted in an opening in a tool head, said apparatus comprising a rotatably mounted wheel, a member adapted to engage the upper end of an elongated vertically directed handle disposed beneath said member, means connecting said member to said wheel for reciprocal vertical movement of said member upon rotation of said wheel, means for disposing a tool head having a handle receiving opening beneath said handle with said opening aligned with said handle, said opening being adapted to hold a charge of potting compound, said member and handle being movable vertically downwardly upon rotational movement of said wheel to move the lower end of said handle into said opening, the downward movement of said handle being progressively slower as the lower end of said handle moves toward the bottom of said opening and engages the potting compound therein, whereby said potting compound is slowly displaced upwardly substantially evenly around and between all of the inner walls of said opening and the adjacent sides of said handle to form a bond between said handle and tool head.

3,888,722

BACK LINER APPLYING APPARATUS

Penn B. Blair, and John W. Demand, both of Topeka, Kans., assignors to Brackett Stripping Machine, Inc., Topeka, Kans.

Filed Nov. 9, 1973, Ser. No. 414,238

Int. Cl. B32b *1/04;* **B42c** *19/00*

U.S. Cl. 156—477 B **8 Claims**

1. A back liner applying apparatus comprising:

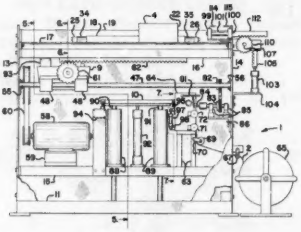
a. an elongate frame having a top portion and first and second ends;

b. a platform having an upper face with means on said frame for selectively effecting up and down movement of said platform;

c. clamping jaws above the platform and having opposed vertical faces extending longitudinally of the frame and on opposite sides of a longitudinal center thereof with means mounting said jaws for movement transversely of the frame;

d. means operatively connected to said clamping jaws for simultaneously moving same toward each other for clamping a plurality of elongate sheets to be joined together with back edges of the sheets resting on and supported in registry by said upper face of the platform, said plurality of clamped sheets being maintained in the clamped position centered relative to said longitudinal center;

e. a glue container mounted on said frame for reciprocable movement longitudinally under said back edges when the platform is in a lowered position, an applicator roller mounted in said glue container and rotatable on a transverse axis, said roller having a peripheral surface of a width greater than the width of said back edges and substantially centered relative to the longitudinal center of the frame, said roller periphery rolling a coating of glue of a selected thickness onto the back edges of said clamped sheets as the glue container is moved thereunder from adjacent said frame first end toward said frame second end and back toward said frame first end;



f. means on said frame adjacent said second end for dispensing back liner tape onto said platform upper face and centered relative to said longitudinal center of the frame, said tape dispensing means being operative in response to movement of the glue container and said tape being under said back edges and extending transversely and longitudinally beyond same;

g. said platform moving means being operative after return of the glue container to adjacent said frame first end to move said platform up and press the tape onto the glue coated back edges.

3,888,723

MACHINE FOR ASSEMBLING A GASKET ASSEMBLY

Paul J. Artzer, Arvada, Colo., assignor to Appleton Electric Company, Chicago, Ill.

Filed Oct. 10, 1973, Ser. No. 405,148

Int. Cl. B32b *31/04;* **B21d** *51/46*

U.S. Cl. 156—499 **17 Claims**

1. An apparatus for forming gaskets, each of which comprises an elastomeric washer having an axial opening therein and a cylindrical outer face and a rigid support member having an axial opening therethrough and a peripheral flange with an inner face, one of said faces having a thermo-responsive adhesive thereon, said apparatus comprising:

a frame;

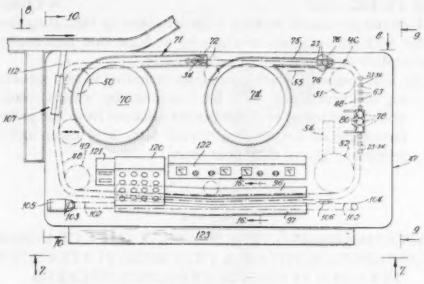
endless conveyor means mounted on said frame and trained for movement in a given direction along a closed path, said conveyor having a plurality of vertically positioned mandrels with their distal ends upwardly, said mandrels being removably mounted, and including a second set of mandrels of a different diameter for use in forming gaskets of a second size;

power means connected to said conveyor means for moving the conveyor means in a given direction, said power means periodically indexing said conveyor means with a

dwell between each indexing movement, the amount of the indexing movement being a multiple of the distance between adjacent mandrels;

first feeding means mounted on said frame and positioned at a first point along said path for positioning a support member with the flange upwardly on a mandrel as that mandrel is at said first point;

second feeding means mounted on said frame and positioned at a second point, in said direction from said first point, for positioning a washer on the mandrel above the



support member as the mandrel carrying the support member is at said second point;

positioning means mounted on said frame and positioned above said path at a point at which mandrels carrying support members and washers move below it, said positioning means being movable downwardly over the mandrel for seating the washer into the member on the mandrel, said positioning means performing said downward movement during a dwell period; and

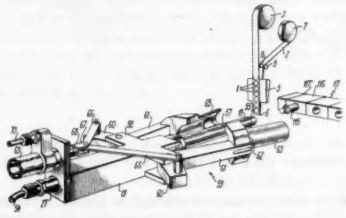
means on said frame for heating the support member for activating said adhesive.

3,888,724

LABELING MACHINE

Walter Spannknebel, Beuren, and Leopold Wicenec, Oberensingen, both of Germany, assignors to Schafer-Etiketten, Hubert H. Schafer, Wolfschlugen, Germany

Filed Oct. 23, 1973, Ser. No. 408,640
Int. Cl. B44c *1/00;* **B65c** *9/14*
U.S. Cl. 156—541 **12 Claims**



1. In a labeling machine for applying labels to sequentially presented objects, including means for sequentially presenting the labels; a label holder for carrying the presented label toward and applying it to the surface of the object to be labeled; guide means for guiding the object to be labeled into a defined position with respect to the label holder, the improvement comprising

a. a supporting face forming part of said label holder, said supporting face having an outline and being disposed perpendicularly to the direction in which said label holder carries and applies the label to the object to be labeled;

b. gripping means for attaching the label to and retaining it on said supporting face in a face-to-face relationship therewith, said gripping means being arranged for allowing displacement of the label in its plane on said supporting face;

c. aligning means for engaging edge portions of the label projecting beyond said outline of said supporting face for shifting the label in its plane on said supporting face into a defined position with respect to said supporting face;

d. means for movably supporting said aligning means; and

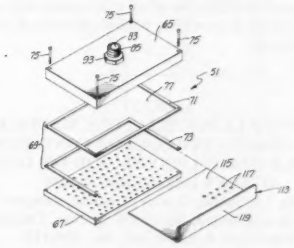
e. means for moving said aligning means towards and away from said supporting face in a direction at least approximately parallel to the plane of said supporting face.

3,888,725

AIR MANIFOLD WITH MASK AND LABEL APPLICATOR UTILIZING THE SAME

John B. French, Hacienda Heights, Calif., assignor to Compac Corporation, Newark, N.J.

Filed Mar. 16, 1973, Ser. No. 342,283
Int. Cl. B65h *29/24*
U.S. Cl. 156—556 **15 Claims**



1. A label applicator for applying a label to an article comprising:

a supporting structure;

means on the supporting structure for releasably retaining the label;

a manifold on the supporting structure;

said manifold defining a chamber adapted to receive gas under pressure and having a slot leading from the exterior of said chamber to the interior of said chamber;

said manifold having aperture means for directing gas from the chamber to apply the label to the article;

a mask having opening means therein, said mask being insertable through said slot into said chamber; and

said manifold including means for mounting said mask in said chamber with said opening means and said aperture means being in at least partial registry and with said mask masking off part of said aperture means whereby said mask influences the configuration of the air pattern which moves from said chamber toward said preselected location.

3,888,726

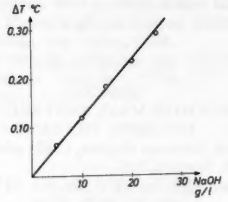
PROCESS FOR DETERMINING ALKALI CONTENT IN ALKALINE PULPING LIQUOR BY A CALORIMETRIC MEASUREMENT OF THE HEAT OF PARTIAL NEUTRALIZATION OF THE PULPING LIQUOR

Bengt Goran Hultman, Domsjoverken, Sweden, assignor to Mo och Domsjo Aktiebolag, Ornskoldsvik, Sweden

Filed July 9, 1973, Ser. No. 377,856
Claims priority, application Sweden, July 14, 1972, 9342/72
Int. Cl. D21c *7/12;* **G01n** *25/48*
U.S. Cl. 162—49 **21 Claims**

1. A process for determining the effective alkali content of an alkaline pulping liquor comprising an alkali metal hydroxide and an alkali metal sulfide, which comprises taking a

sample of the alkaline pulping liquor, mixing the sample with an acid reacting buffer having a pH less than the pH of the alkaline pulping liquor, in an amount to bring the pH of the resulting mixture to within the range from about 9.5 to about



12.5, measuring the heat liberated in the resulting partial neutralization of the effective alkali calorimetrically, and from such measurement determining the effective alkali content of the pulping liquor.

3,888,727

TREATMENT OF LIGNOCELLULOSIC MATERIAL IN AN ALKALINE PULPING LIQUOR CONTAINING ANTHRAQUINONE SULPHONIC ACID FOLLOWED BY OXYGEN DELIGNIFICATION

Samuel Kenig, Longueuil, Quebec, Canada, assignor to Canadian Industries Limited, Montreal, Quebec, Canada

Filed Apr. 8, 1974, Ser. No. 459,112

Claims priority, application United Kingdom, Apr. 26, 1973, 19794/73; Dec. 31, 1973, 60303/73

Int. Cl.[2] D21C *9/10*

U.S. Cl. 162—65 **14 Claims**

1. A process for the delignification of lignocellulosic material which comprises the steps of

1. treating lignocellulosic material in a closed reaction vessel with pulping liquor containing a reagent selected from the group consisting of an alkali metal hydroxide and a mixture of an alkali metal hydroxide and an alkali metal sulphide, wherein there is added to said pulping liquor 0.02 to 2.0 percent, preferably 0.05% to 1.0% by weight, based on the weight of the lignocellulosic material of a material selected from the group consisting of anthraquinone mono sulphonic acid, anthraquinone disulphonic acid, alkali metal salts of said acids and admixtures of aforesaid acids and salts, at a temperature in the range 160°C to 195°C for a period of not greater than 120 minutes and preferably not greater than 90 minutes, the temperature and period of treatment being adapted to provide a pulp yield of 55 to 65 percent by weight,
2. displacing the pulping liquor from the lignocellulosic material with water, or an aqueous solution of alkali metal hydroxide,
3. treating the lignocellulosic material without prior defiberization at a consistency of 2.0 to 30.0 percent by weight in aqueous suspension for 0.5 to 30 minutes at 20°C to 90°C with 2.0 to 20.0 percent by weight of alkali metal hydroxide.
4. treating the alkaline lignocellulosic material in aqueous medium at a consistency of from 3.0 to 35.0 percent by weight with oxygen or an oxygen-containing gas for 10 to 120 minutes at a temperature of 80°C to 140°C and a partial pressure of oxygen of 30 to 200 pounds per square inch, and
5. washing the oxygen treated lignocellulosic material with water.

3,888,728

PROCESS FOR MANUFACTURING CARRIER SHEETS TREATED WITH HARDENABLE AMINOPLAST RESIN PRELIMINARY CONDENSATES FOR SURFACE COATING

Bruno Petrik, and Erich Ruf, both of Essen, Germany, assignors to TH Goldschmidt AG, Essen, Germany

Filed Sept. 10, 1973, Ser. No. 395,549

Claims priority, application Germany, Oct. 18, 1972, 2250991

Int. Cl. D21h *1/40*

U.S. Cl. 162—167 **6 Claims**

1. In the process of making a carrier sheet by saturating said sheet with an aqueous solution of at least one hardenable aminoplast resin preliminary condensate,

the improvement which comprises including in said saturating solution about 0.05 to 3 percent by weight, based upon solid resin, of a compound selected from the group consisting of an ethylene glycol fatty acid ester and a propylene glycol fatty acid ester.

3,888,729

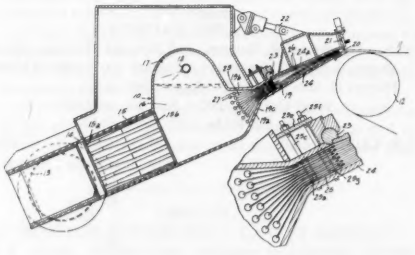
PAPERMAKING MACHINE HEADBOX SLICE CHAMBER CONTAINING PIVOTABLE THIN RIGID PLATES WITH FLEXIBLE ELEMENTS ATTACHED THERETO

Joseph D. Parker, deceased, late of 12052 S. Gate Rd., Roscoe, Ill. 61073; by Dorothy C. Parker, executrix, 12052 S. Gate Rd., Roscoe, Ill. 61073; Richard E. Hergert, 402 Liddle St., Rockton, Ill. 61072, and Arnold J. Roerig, 1508 S. Ridge Rd., Beloit, Wis. 53511

Filed Nov. 6, 1972, Ser. No. 303,972

Int. Cl. D21f *1/02*

U.S. Cl. 162—343 **16 Claims**



1. In a headbox for delivering stock to a forming surface, the headbox having a slice chamber and a slice opening, the improvement comprising,

a plurality of rigid plates positioned in the slice chamber,

each of said plates extending transversely of said headbox and projecting downstream generally in the direction of stock flow,

trailing elements attached to the downstream ends of said plates,

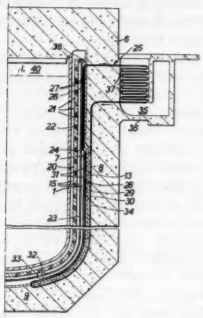
said elements being attached to said plates only at their upstream ends with their downstream portions unattached and constructed to be self-positionable so as to be solely responsive to forces exerted thereon by the stock flowing toward the slice opening,

and means yieldably supporting said rigid plates so that the plates are self-positionable in a direction transverse of their surfaces so as to be solely responsive to forces exerted thereon by the stock flowing toward the slice.

3,888,730
NUCLEAR REACTORS

George Oliver Jackson, Timperley, England, assignor to United Kingdom Atomic Energy Authority, London, England

Filed Feb. 17, 1969, Ser. No. 799,832
Claims priority, application United Kingdom, Feb. 23, 1968, 9038/68
Int. Cl. G21c *1/02*
U.S. Cl. 176—38 1 Claim



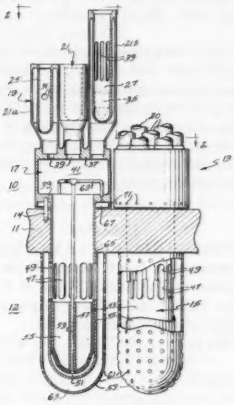
1. A liquid metal cooled fast reactor comprising a fast reactor core structure, a heat exchanger, and means for circulating a liquid coolant through said core structure and heat exchanger, wherein there is provided a single wall open top coolant tank containing a pool of liquid metal coolant in which said core structure is submerged and said heat exchanger and circulating means are immersed, a concrete vault structure comprising a wall part and a base part and a roof part containing said single wall coolant tank and spaced from the tank at said wall and base part, a membrane lining for said vault structure, sealing means between that part of the lining of the roof part and that part of the lining of the wall part of the vault structure, and means for cooling at least the wall part of said vault structure, there being provided, in the space between the coolant tank and the membrane lining, in the following order outwardly from the tank, a heat insulation structure, a baffle, and pipe means conducting coolant fluid, said pipe means extending into the body of the vault structure to cool at least the wall part of the vault structure, and through the vault structure to a heat exchanging coil outside the vault structure and from said coil back to the space between the coolant tank and membrane lining, and wherein said space is filled with an inert gas, with means for inducing convection circulation of said gas.

3,888,731
MODULAR CORE COMPONENT SUPPORT FOR NUCLEAR REACTOR

Lester M. Finch, and Andy J. Anthony, both of Pasco, Wash., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Mar. 15, 1973, Ser. No. 341,612
Int. Cl. G21c *15/00*
U.S. Cl. 176—50 3 Claims

1. In a nuclear reactor core including a grid plate with openings therethrough separating zones of high and low coolant pressure, a plurality of receptacles depending from said grid plate into said high pressure coolant zone, each of said receptacles having side wall openings for admitting coolant flow and a top opening aligned with an opening through said grid plate, and core components requiring a coolant flow therethrough supported by said grid plate, the improved combination comprising a plurality of replaceable and interchangeable core component modules each having a coolant inlet portion disposed through an opening in said grid plate into a corresponding one of said receptacles, said coolant inlet portion having side wall openings alignable with said side wall openings in said corresponding receptacle; each module having a vestibule with an internal chamber defined by upper, lower and lateral walls disposed above said grid plate, said lower wall having an opening for admitting coolant flow and being joined to said coolant inlet portion; and each module having a plurality of elongated, vertical socket members connected to and above said vestibule, each of said socket members including an inner receptacle part adapted to receive and support one of said core components, said receptacle part having side wall openings for admitting coolant flow to said core component, and each of said socket members including



an outer jacket spaced from and extending over the length of said receptacle part to define a coolant flow passageway to said side wall openings in said receptacle part, each of said outer jackets having a tubular neck at the lower end thereof connected into said upper vestibule wall at spaced apart locations and in communication with said vestibule internal chamber, said tubular necks being attached at peripheral and central locations on the surface of said upper vestibule wall and said tubular necks at said peripheral locations being axially offset on respective socket members and aligned inwardly toward the center of said upper vestibule wall surface to permit close assemblage of core components, said vestibule including said internal chamber for containing coolant, extending over and shielding said grid plate at locations beneath and intermediate said locations of tubular neck attachment from upwardly originating radiation.

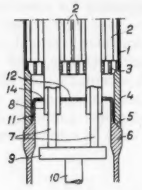
3,888,732
INLET FOR FUEL ASSEMBLY HAVING FINGER CONTROL RODS

Ake Berglund; Antti Suvanto, and Lars Tornblom, all of Vasteras, Sweden, assignors to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Continuation-in-part of Ser. No. 286,834, Sept. 6, 1972, abandoned. This application Sept. 14, 1973, Ser. No. 397,302
Int. Cl. G21c *15/02*
U.S. Cl. 176—50 3 Claims

1. In a liquid-cooled nuclear reactor having a bottom wall in which the core comprises vertically arranged fuel assemblies (1) placed on supporting members (6) comprising tubular members secured to the bottom wall and extending upwardly therefrom and having openings thereinto for cooling liquid and having control rods displaceably arranged in guide tubes (8) positioned between the fuel rods (2) inside the fuel

assemblies, the bottom end of said fuel assemblies and the top portion of said supporting members having mating surfaces, the top of said supporting member (**6**) being closed with a horizontal end piece (**12**) having openings therein forming throttling means (**14, 15**) for liquid flow which passes from below up through the supporting member and past the fuel rods in the fuel assembly, said end piece being affixed to and

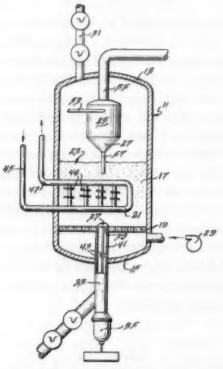


a part of said supporting member, the lower ends of said guide tubes passing through said openings in said end piece to a position below said end piece, said lower ends of said guide tubes also being inlets to the guide tubes (**8**) for the control rods (**7**), where a higher pressure prevails at the inlets to the guide tubes than above the end piece, whereby a stronger flow of coolant is produced through the guide tubes than through the rest of the fuel assembly.

3,888,733
FLUIDIZED-BED NUCLEAR REACTOR

Earl S. Grimmett, and Jay F. Kunze, both of Idaho Falls, Idaho, assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Dec. 21, 1973, Ser. No. 427,391
Int. Cl. G21c *3/44*
U.S. Cl. 176—52 **1 Claim**



1. A fluidized-bed nuclear reactor comprising a reactor vessel having a gas inlet in the lower portion and a gas outlet in the upper portion;

a mass of composite particles disposed within said reactor vessel, said composite particles having cores of $^{232}ThO_2$ of about 200 microns diameter enclosed within graphite coatings of about 200 microns thickness and being 2.6 to 3.8 gm/cm^3 in density;

a first conduit circuit interconnecting said gas inlet to said gas outlet of said reactor vessel, said circuit having gas-pumping means for circulating gaseous $^{233}UF_6$ upwardly through said reactor vessel at about 40 atmospheres pressure and at an incipient fluidizing velocity of 25 to 30 cm/sec to fluidize said mass of particles in a state of aggregative fluidization in a volume of about 60 cubic meters, wherein a fission reaction is produced, having a heat exchanger within said circuit external to said reactor vessel for cooling said gaseous $^{233}UF_6$ and having absorber means within said circuit for removing fission products from said gaseous $^{233}UF_6$;

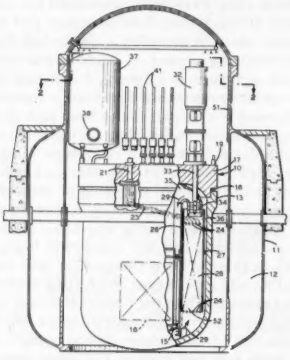
a shunt conduit circuit connected into said first conduit circuit across said absorber means, said shunt conduit circuit including a reservoir and control valve means for controlling the pressure within said reactor vessel, for withdrawing $^{233}UF_6$ gas with fission products at a first location, and for adding $^{233}UF_6$ gas with at least a portion of said fission products removed at a second location downstream of said first location to establish and maintain a fission reaction;

a second conduit circuit for circulating a coolant fluid and removing heat produced by said fission reaction within said reactor vessel, said circuit including a portion comprising tubing of zirconium-based alloy disposed within said reactor vessel at positions submerged within said mass of particles and a portion extending outside said reactor vessel including energy conversion means for removing and utilizing said heat produced.

3,888,734
COMPACT NUCLEAR REACTOR

Slavko I. Juric, Lynchburg, Va., assignor to The Babcock Wilcox Company, New York, N.Y.

Filed June 15, 1971, Ser. No. 153,304
Int. Cl. G21c *15/22, 15/24, 15/18*
U.S. Cl. 176—61 **2 Claims**



1. A pressurized water reactor having a reactor core with a coolant flowpath that has a natural upward circulation direction and a structure for pressurized water flow therethrough, comprising a pressure vessel having a longitudinal axis for containing the pressurized water and promoting the flow of the pressurized water therewithin, said pressure vessel having a generally cylindrical shape that is open on one end, said open end being transverse to said longitudinal axis of said pressure vessel, a closure separably engaged to said pressure vessel and fitting over said pressure vessel opening, a longitudinally disposed shroud positioned in said pressure vessel forming an annular space with said pressure vessel for the pressurized water to flow upwardly through said annular space selectively in a forced flow direction that is opposite to a downward natural circulation longitudinal direction in said annular space, a bank of vapor generating tubes disposed in said annular flow space, said tubes having inlet and outlet openings, a plurality of inlet headers secured to said closure and in communication with said tube inlet openings and a plurality of outlet headers secured to said closure and which communicate with said tube outlet openings, a plurality of control rods operatively passing through said closure, at least

one external pressurizer engaged to said closure and communicating with the interior of said pressure vessel through said closure to maintain the pressurized water in the liquid phase, and a plurality of pumps secured to said closure and each having a shaft passing through said closure, each of said shafts provided with an impeller positioned in said annular flow space beneath said closure for producing said forced flow upwardly over said vapor generating tubes and downwardly through said core, wherein said pressurized water flows through said annular space in the downward flow longitudinal direction and through the core in an upward natural circulation longitudinal direction for protection and safety upon failure of said pumps, and whereby separation of said closure from said pressure vessel for inspection, maintenance and repair will remove said inlet and outlet headers, said control rods, said pressurizer and said plurality of pumps from said pressure vessel.

3,888,735

INTEGRAL-FUEL BLOCKS

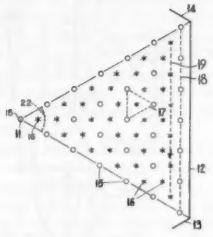
Christopher Cunningham, Leicester, and Sidney David Simpkin, Enderby, both of England, assignors to British Nuclear Design of Construction Ltd., Leicestershire, England

Filed June 25, 1973, Ser. No. 373,032

Claims priority, application United Kingdom, June 30, 1972, 30781/72

Int. Cl. G21c *5/02*

U.S. Cl. 176—84 **7 Claims**



1. A prismatic fuel-containing moderator block having two kinds of channels, namely fuel-containing channels and coolant channels, disposed parallel to each other and to edge faces of the block, with the coolant channels arranged in rows on an equilateral triangular lattice pattern and the fuel-containing channels disposed in a regular lattice pattern with one fuel-containing channel between and equidistant from each of the coolant channels in each group of three mutually-adjacent coolant channels, wherein the edge faces of the block are parallel to the rows of coolant channels and the channels nearest to each edge face are disposed in two rows parallel thereto, with one of the two rows containing only coolant channels and the other of the two rows containing only fuel-containing channels.

3,888,736

METHOD OF RECOVERING MICROBIAL CELLS CONTAINING PROTEIN

Hiroshi Iizuka; Naosuke Seto, both of Tokyo, and Sadao Sakayanagi, Kawasaki, all of Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 20,054, March 16, 1970, abandoned. This application Aug. 1, 1972, Ser. No. 276,957

Claims priority, application Japan, Sept. 16, 1969, 44-72992

Int. Cl. C12d *13/00*

U.S. Cl. 195—28 R **10 Claims**

1. A method of recovering protein-containing cells, which comprises culturing a microorganisms selected from the group consisting of Mycobacterium cuneatum and Mycobacterium petroleophilum, bacteria belonging to the genus Mycobacterium under aerobic conditions in a culture medium containing as a carbon source selected from a mixture of CO_2 and H_2, C_1 – C_5 hydrocarbons and C_{11} – C_{18} n-paraffins, and separating and recovering cells from the culture broth.

3,888,737

PROCESS OF PRODUCING L-LYSINE USING MIXED MICROORGANISMS

Kiyoshi Watanabe; Tamotsu Hirakawa; Kenji Takahara; Yoshio Nakamura; Sueo Iwasaki, and Tutomu Tanaka, all of Hyogo, Japan, assignors to Kanegafuchi Chemical Industries Co., Ltd., Osaka, Japan

Filed Feb. 22, 1974, Ser. No. 445,041

Claims priority, application Japan, Feb. 22, 1973, 48-21982; June 22, 1973, 48-71121

Int. Cl. C12b *1/00*

U.S. Cl. 195—28 R **10 Claims**

1. A fermentation process for producing L-lysine comprising aerobically culturing a mixture of (1) a hydrocarbon-assimilating and L-lysine producing bacterium and (2) at least one hydro-carbon non-assimilating microorganism which has low capability for L-lysine production in a nutrient medium which contains a hydrocarbon or a mixture of hydrocarbon as a main carbon source, and recovering said L-lysine from said medium.

3,888,738

METHOD FOR PURIFYING CYCLODEXTRIN-PRODUCING ENZYMES

Shigetaka Okada, Nara, and Sumio Kitahata, Osaka, both of Japan, assignors to Hayashibara Kabushiki-Kaisha, Okayama, Japan

Filed Oct. 31, 1973, Ser. No. 411,218

Int. Cl. C07g *7/02*

U.S. Cl. 195—66 R **4 Claims**

1. A method for purifying alpha-1,4-glucan 4-glycosyltransferase, comprising adsorbing the enzyme on cyclodextrin, desorbing and recovering the enzyme.

3,888,739

REAGENTS AND METHODS FOR DETERMINING AMYLASE CONCENTRATIONS

Lawrence C. Whetzel, Irvine, and Margaret E. Townsend, Tustin, both of Calif., assignors to Bio-Reagents & Diagnostics, Inc., Irvine, Calif.

Filed May 7, 1973, Ser. No. 357,905

Int. Cl. G01n *33/00*

U.S. Cl. 195—99 **4 Claims**

1. A solution of starch in distilled water for use with a prescribed iodine solution for determining the concentration of amylase, said solution comprised of the following:

a. a buffer in a concentration of about 0.002M to about 2.0M, and having a pH between about 6 to about 8;

b. a chloride salt in a concentration of about 0.001M to about 1M; and

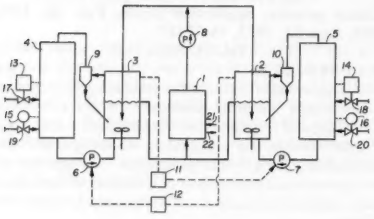
c. a starch in a concentration of about 0.3 to about 20.0 grams per liter, and consisting essentially of a starch that is readily soluble in water at room temperature and will produce a definite blue color upon the addition of an aqueous iodine solution thereto,

said solution having a pH of about 7.0.

3,888,740
METHOD FOR CULTURING HYDROGEN OXIDIZING BACTERIUM

Ayaaki Ishizaki, Kawasaki; Yasushi Morinaga; Hiroyuki Sakakibara, both of Yokohama, and Masao Horiuchi, Kawasaki, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed Aug. 28, 1974, Ser. No. 501,136
Claims priority, application Japan, Sept. 5, 1973, 48-99908
Int. Cl. C12b *1/14*
U.S. Cl. 195—109 **5 Claims**



1. A method of culturing a hydrogen oxidizing bacterium which comprises:

a. inoculating an aqueous culture medium with said bacterium;

b. circulating a first portion of said medium between a container and a first enriching station;

c. circulating a second portion of said medium separate from said first portion between said container and a second enriching station;

d. dissolving hydrogen gas in said first portion at said first station;

e. dissolving oxygen gas in said second portion at said second station at a rate to keep the concentration of oxygen gas in the hydrogen gas at said first station below the explosive limit of the gas mixture at said first station,

1. the hydrogen gas being dissolved in said medium at said first station at a rate to keep the concentration of hydrogen gas in the oxygen gas at said second station below the explosive limit of the gas mixture at said second station;

f. mixing said first and second portions respectively enriched with dissolved hydrogen and oxygen in said container; and

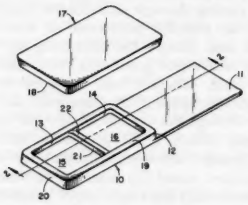
g. maintaining in said medium a concentration of dissolved carbon dioxide sufficient for maintaining the growth of said bacterium.

3,888,741
CULTURING MEANS AND TEST KIT

Ronald Freake; Mau H. Kuo, both of Elkhart, and Devendra Vaikunthlal Mehta, South Bend, all of Ind., assignors to Miles Laboratories, Inc., Elkhart, Ind.

Filed Apr. 25, 1974, Ser. No. 464,107
Int. Cl. C12k *1/10*
U.S. Cl. 195—139 **34 Claims**

1. Means for culturing a microorganism in an environment enriched with a gas, comprising a microbiological nutrient means; a gas generating composition comprising at least two solid reactants which when contacted with water react to produce said gas and means for controlling the rate of reaction between said reactants, and thereby the rate of release of said

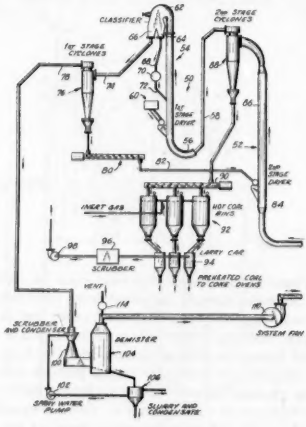


gas; and means for enclosing said nutrient means and said gas generating composition.

3,888,742
POLLUTION-FREE COAL-PREHEATING WITH WASTE HEAT FROM DRY COKE-QUENCHING

Roland Kemmetmueller, Pittsburgh, Pa., assignor to American Waagner-Bird Company Inc., Pittsburgh, Pa.

Filed Jan. 23, 1974, Ser. No. 435,749
Int. Cl. C10b *39/02*
U.S. Cl. 201—39 **21 Claims**

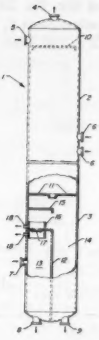


1. In a method for operating a coke plant, the steps of circulating an inert gas along a closed path, directing the inert gas as it circulates along said closed path through a body of hot coke shortly after discharge of the body of hot coke from a coke oven so that the inert gas cools the hot coke while extracting heat therefrom to raise the temperature of the inert gas, feeding wet coal to a part of the path to which the thus-heated inert gas travels after passing through the body of hot coke so that the wet coal is dried by direct contact with the heated inert gas, thus cooling the inert gas while drying the coal with heat extracted from the hot coke during direct contact between the wet coal and the heated inert gas, delivering the thus-dried coal to a coke oven, returning the inert gas along a return part of said closed path from the location where coal drying takes place back to a body of hot coke to again be heated by the latter before again returning to the location where the wet coal is situated to be dried by the heated inert gas, and completely drying the inert gas as it travels along the return part of the closed path to a body of hot coke so that the inert gas is in a moisture-free condition when reaching the body of hot coke.

3,888,743
DISTILLATION COLUMN REBOILER SECTION WITH INTERNAL FLOW SENSING MEANS

R. Gene Fickel, Roselle, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Apr. 11, 1974, Ser. No. 459,974
Int. Cl. B01d 3/14
U.S. Cl. 202—158 7 Claims



1. A reboiler section adapted to be disposed within a distillation column which comprises, in combination:
   a. a chordal baffle vertically-disposed in said reboiler section, connected at its lower end to the bottom of said column and terminating, at its upper end, a finite distance below the lowermost tray, or deck of said column, thereby forming two segmental bottom chambers in said reboiler section;
   b. a first fluid outlet port in the bottom of the first of said two chambers, and a fluid inlet port in open communication with the second of said chambers;
   c. flow-measuring means responsive to upward flowing vapors leaving said reboiler section within said second chamber, and disposed at the upper end thereof;
   d. signal-sensing means, in open communication with said flow-measuring means, for transmitting a signal, representative of the rate of flow through said flow-measuring means, without the confines of said reboiler section; and,
   e. an imperforate second baffle disposed between said lowermost tray and said flow-measuring means, said second baffle extending horizontally from said second chamber a distance less than the internal diameter of said column.

3,888,744
METHOD FOR ELECTRODEPOSITION OF NICKEL-CHROMIUM ALLOYS AND COATING OF URANIUM

Robert W. Stromatt, Richland, Wash., and Jerry R. Lundquist, San Jose, Calif., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Oct. 24, 1974, Ser. No. 517,663
Int. Cl. C23b 5/32, 5/50
U.S. Cl. 204—1.5 7 Claims

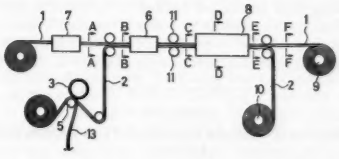
1. A process for the electrodeposition of a nickel-chromium binary alloy on a cathodic substrate comprising:
   immersing the substrate in an aqueous plating bath consisting essentially of about 0.08 to 0.19 M disodium salt of ethylenediaminetetraacetic acid, about 0.5 to 1.0 M chromium potassium sulfate, about 0.25 to 0.5 M nickel sulfate and about 0.3 to 0.5 M boric acid;
   adjusting the pH of the solution to about 1.5 to 2.5 and the temperature to between about 45° and 55°C.; and
   agitating the solution while passing a current of from about 125 to about 330 mA/cm² through the solution to the cathodic substrate, thereby depositing a binary nickel-chromium alloy on the substrate.

7. In the process for protecting uranium metal from corrosion by applying a layer of nickel to the outer surface of the metal, the improvement comprising immersing the nickel-plated uranium metal in an aqueous plating bath consisting essentially of about 0.08 to 0.19 M disodium salt of ethylenediaminetetraacetic acid, about 0.5 to 1.0 M chromium potassium sulfate, about 0.25 to 0.5 M nickel sulfate and about 0.3 to 0.5 M boric acid;
   adjusting the pH of the solution to about 1.5 to 2.5 and the temperature to between about 45° and 55°C.; and
   agitating the solution while passing a current of from about 125 to about 330 mA/cm² through the plating solution to the nickel-plated uranium metal, thereby depositing a layer of a binary nickel-chromium alloy on the nickel-plated uranium metal.

3,888,745
CONTINUOUS AND PARTIAL PLATING PROCESS OF STRIP METAL

Tetsuya Hojyo, No. 110, Karasugatsuji-cho, Tennoji-Ku Osaka, Japan

Filed Feb. 13, 1974, Ser. No. 442,094
Claims priority, application Japan, Feb. 23, 1973, 48-21907
Int. Cl. B44d 1/52
U.S. Cl. 204—18 R 6 Claims



1. A process of continuous and partial plating of strip metal comprising the steps of:
   syncronously supplying a strip of metal and a strip of tape covered with a hot-setting adhesive on one side thereof, said strip of tape having therein a perforation, to be used for uncovering the part of said strip of metal to be plated; bringing together said tape and said strip of metal and causing said tape to stick onto said strip of metal by feeding said tape and said strip of metal through a heating step and thereafter pressing said tape and said strip of metal together;
   introducing said strip of metal with said tape adherent thereto to a plating step wherein plating is carried out only on the uncovered part of said strip of metal; and
   separating said tape from said strip of metal.

3,888,746
METHOD OF PROVIDING AN INTERMEDIATE STEEL LAYER FOR CHROME PLATING ON ROTOR HOUSINGS

James C. Uy, Dearborn Heights, and Yeshwant P. Telang, Grosse Ile, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

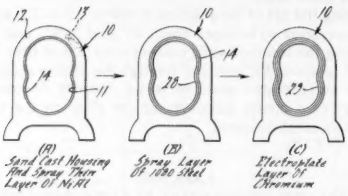
Filed Jan. 4, 1974, Ser. No. 430,974
Int. Cl. C23b 5/62, 5/06
U.S. Cl. 204—36 10 Claims

1. A method of fabricating a rotor housing for a rotary internal combustion engine, comprising:
   a. preparing an aluminum casting defining said rotor housing having an annular configuration with an internal surface shaped as a trochoid, said casting having dimensionally machined sides and a rough as-cast trochoid surface, said casting having at least one passage opening

into said surface which is temporarily closed by an inert plug during subsequent processing,

b. with said casting maintained at a temperature of at least 200°F, applying a thin self-fused coating of heated nickel-aluminide particles across said entire trochoid surface to form a layer thereon with a thickness no greater than 0.01 inch,

c. immediately applying a uniform coating of carbon steel particles having at least the outer surfaces thereof heated to a temperature of at least 2,000°F for self-fusing when impelled against said first coated casting surface,



d. cooling said second coated casting to a temperature generally equal to or below the bath temperature of a selected chromium plating electrolyte, immersing said coated casting in said electrolyte and applying sufficient potential between an anode and said casting to deposit a third thin coating constituted of chromium on said casting surface in the thickness range of about 0.007 inch, and

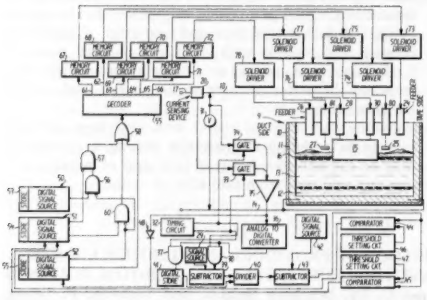
e. cooling said tri-coated casting to ambient temperature conditions in a manner to insure a reduced internal stress condition of said coating, said triple coating having a combined thickness in the range of 0.048 to 0.076 inches.

3,888,747

METHOD OF AND APPARATUS FOR PRODUCING METAL

Joseph A. Murphy, Murraysville, Pa., assignor to National-Southwire Aluminum Co., Hawesville, Ky.

Filed Oct. 18, 1972, Ser. No. 298,405
Int. Cl. C22d *3/12*; **B01k** *3/00*; **C22d** *3/02*
U.S. Cl. 204—67 **20 Claims**



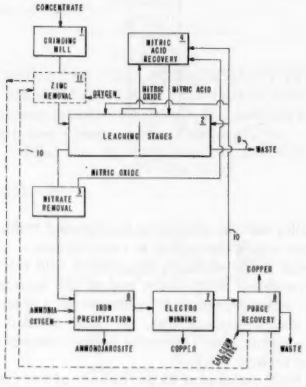
1. A method of producing metal comprising providing an electrolytic bath containing dissolved oxide of the metal in a reduction cell, causing direct current to flow through said bath, collecting said metal on the bottom of said reduction cell, sensing the direct voltage across said cell, producing a limited output signal corresponding to the voltage across said cell up to a given level thereof, which is less than maximum anode effect voltage level, and producing a signal of ONE level upon occurrence of any output signal level if the limited output signal is in excess of a given threshold level, which is less than maximum possible level of the limited output signal, and developing a signal of ZERO level upon occurrence of any output signal level below the given threshold level, the signal of ONE level being indicative of occurence of anode effect.

3,888,748

RECOVERY OF METAL VALUES FROM ORE CONCENTRATES

Henry M. Brennecke, Woodstown, N.J., assignor to E. I. du Pont de Nemours & Co., Wilmington, Del.

Continuation-in-part of Ser. No. 267,075, June 28, 1972, abandoned. This application June 4, 1973, Ser. No. 366,876
Int. Cl. C22b *3/00, 15/08*
U.S. Cl. 204—108 **28 Claims**



1. A hydrometallurgical process for recovery of metals from ore concentrates having copper, iron and sulfur therein which comprises

a. contacting said concentrate in an aqueous medium with a combination of nitric and sulfuric acids at a temperature of at least 50°C. until the nitrate is reduced to less than about 30 grams per liter in the presence of concentrate;

b. separating the liquid and solid from Step (a);

c. contacting the solids from Step (b) with an aqueous solution containing nitric acid in excess of that required to dissolve the copper in said solids at a temperature of at least 50°C. until substantially all of the copper in said solids is dissolved wherein the total amount of aqueous solution in Steps (a) and (c) contains sufficient acid to maintain copper and iron in solution and sufficient water to produce about 2–10 parts of copper per 100 parts of liquid from Step (b);

d. separating the solids from Step (c) and directing the liquid from Step (c) to Step (a);

e. heating the liquid from Step (b) to a temperature in the range of 140°–200°C. to reduce the nitrate concentration therein to less than about one part per 1,000 parts of solution;

f. precipitating iron from the liquid from Step (e) as jarosite;

g. electrowinning copper from the liquid of Step (f); and

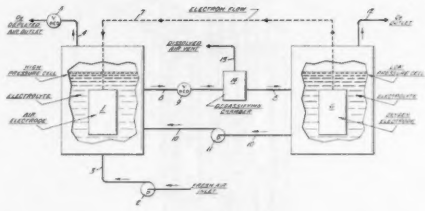
h. recycling at least a portion of the liquid from Step (g) to further contact concentrate;

said process being further characterized in that oxidizing conditions are maintained in Steps (e) and (f) until substantially all of the iron is present as the ferric ion.

3,888,749
ELECTROLYTIC SEPARATION OF OXYGEN FROM AIR

Victor M. Chong, Media, Pa., assignor to Sun Research and Development Co., Marcus Hook, Pa.

Filed Aug. 31, 1972, Ser. No. 285,406
Int. Cl. C01b *13/04*; B01k *1/00*
U.S. Cl. 204—129 4 Claims



1. A process for the electrolytic separation of oxygen from air without application of external current comprising:

a. introducing air into a first electrolytic cell comprising a first electrode and an electrolyte,

b. circulating electrolyte between said first cell and a second electrolytic cell comprising a second electrode and an electrolyte, said first electrode and said second electrode being electrically connected to allow flow of current from said second electrode to said first electrode,

c. maintaining the partial pressure of oxygen in said first cell higher than the partial pressure of oxygen in said second cell,

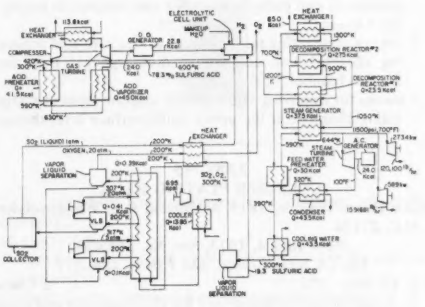
d. withdrawing oxygen-depleted air from said first cell and

e. withdrawing oxygen from said second cell.

3,888,750
ELECTROLYTIC DECOMPOSITION OF WATER

Lee E. Brecher, North Huntingdon, and Christopher K. Wu, Turtle Creek, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 29, 1974, Ser. No. 437,571
Int. Cl. C01b *13/04*, *13/02*, *17/50*
U.S. Cl. 204—129 6 Claims

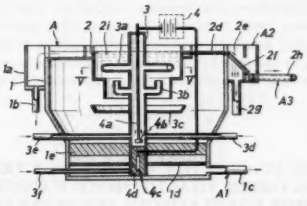


2. The method of claim 1 wherein the sulfuric acid derived from the electrolytic means is concentrated by the thermochemical means prior to being decomposed.

3,888,751
METHOD FOR PURIFYING WASTE WATER

Toyomasa Minegishi, 1108,3-21-20, Nishiazabu, Tokyo, Japan

Filed Apr. 18, 1973, Ser. No. 352,281
Claims priority, application Japan, Dec. 20, 1972, 47-002358
Int. Cl. C02c *5/12*
U.S. Cl. 204—152 3 Claims



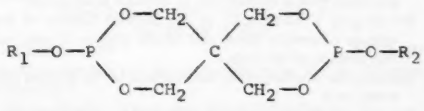
1. A method of treating waste water sludge in a vessel having an outer container and an inner tubular member of much smaller outer diameter than said outer container extending upwardly through the interior of the outer container and having spaced apart respective positive and negative electrical terminals therein at an electrical potential, comprising directing a sludge waste flow to be treated into the lower end of the inner tubular member and a quantity of electrolyte in order to produce an electrolytic action adjacent said terminals in a quantity and rate to cause the sludge waste to produce flocculation of the material, further directing a plurality of partial flows of sludge waste flow with the flocculants already produced upwardly and tangentially into the outer container to maintain the water level in the outer container to cause overflow thereof, mixing the partial flows to promote flocculation reaction in the outer container to form the flocculating materials into a ball size sludge and passing at least a portion of the overflow through a screen to separate the liquid from the solid flocculations, and collecting the floculations from the screen.

3,888,752
PHOSPHITE ESTER ANTIOXIDANTS IN RADIATION CURED STYRENE BUTADIENE ELASTOMERS

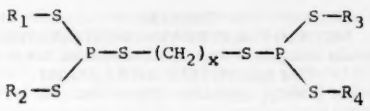
Roger J. Eldred, Detroit, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 28, 1973, Ser. No. 419,702
Int. Cl. B01j *1/10*, *1/12*
U.S. Cl. 204—159.18 3 Claims

1. In the process of crosslinking and curing a styrene-butadiene copolymer having a styrene to butadiene weight ratio in the range of 15:85 to 50:50 by the bombardment of high energy electrons, the improvement comprising incorporating an organic phosphite ester in the noncrosslinked styrene-butadiene copolymer composition prior to irradiation, said ester being selected from the group consisting of a pentaerythritol diphosphite having the general formula:



where R_1 and R_2 are alkyl groups containing from 12 to 20 carbon atoms, and a hexathio diphosphite having the general formula:



where R_1, R_2, R_3 and R_4 are alkyl groups containing from 10 to 15 carbon atoms and x is from 4 to 8, said organic phosphite ester being present in an amount ranging from 2 parts by weight to 15 parts by weight per 100 parts by weight of said styrene-butadiene copolymer composition, said organic phosphite ester being substantially nonreactive and noncatalytic during said irradiation induced crosslinking process and remaining in the crosslinked styrene-butadiene copolymer composition to provide protection against oxidative degradation.

3,888,753

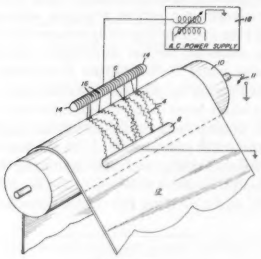
CORUSCATE ELECTRICAL DISCHARGE TREATMENT OF POLYMERIC FILM TO IMPROVE ADHERABILITY THEREOF TO GELATINOUS AND OTHER COATINGS

Lauri W. Kiikka, Victor, and Ronald L. Hartman, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 171,656, Aug. 13, 1971, Pat. No. 3,755,683. This application Jan. 2, 1973, Ser. No. 320,050

Int. Cl. G03c *1/82*; **H01t** *19/04*

U.S. Cl. 204—168 **11 Claims**



1. A method for producing a coruscate electrical discharge which comprises:

positioning a web of polymer between (1) a pair of spaced apart power and ground electrodes both located on the same side of said web and separated by air gaps from one surface of the web and (2) a conducting surface opposite the other surface of the web,

supplying high voltage alternating current electricity from a power supply to the power electrode, said electrode having an arcuate surface of substantially 90° and being provided with a multiplicity of arcuate knife edges,

discharging a multiplicity of intermittent flashes of high voltage electricity from said power electrode onto said one surface of the web,

tracking the discharges on said surface to the ground electrode, and

drawing off the electricity through the ground electrode,

said web of polymer consisting essentially of a linear polymer which is crystalline or partially-crystalline and is oriented or non-oriented.

3,888,754

OZONE MEASURING CELL

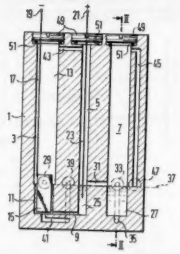
Helmut Karl Ernst Tiefenau, Gottingen-Weende, Germany, assignor to Max-Planck-Gesellschaft ZUR Forderung der Wissenschaften e. V., Gottingen, Germany

Filed Nov. 8, 1973, Ser. No. 414,613

Claims priority, application Germany, Nov. 9, 1972, 2254858

Int. Cl. G01n *27/46*

U.S. Cl. 204—195 R **7 Claims**



1. Ozone measuring cell comprising:

a. a measuring chamber which may be flushed by an ozone-containing gas;

b. a cathode and an anode arranged within said chamber in such a manner that potassium iodide reaction solution passes continuously from cathode to anode;

c. said measuring chamber including a cathode chamber which contains said cathode and an anode chamber separate from said cathode chamber which contains said anode;

d. said cathode chamber being connected to said anode chamber by a capillary tube;

e. means for supplying ozone-containing gas to the lower end of said cathode chamber;

f. said cathode chamber being divided into a reaction portion and a separating portion thereabove;

g. means for supplying said reaction solution to said cathode chamber at a point between the reaction and separating portions thereof;

h. a separating chamber positioned next to said anode chamber;

i. said cathode and anode chambers and said separating chamber being constructed in an airtight manner;

j. means connecting said anode chamber with the separating portion of said cathode chamber and adapted to supply a gas thereto;

k. means connecting said anode chamber with said separating chamber and adapted to discharge gas from said anode chamber; and

l. means for removing said reaction solution from said separating chamber at the upper liquid surface level thereof.

3,888,755

CYLINDER PLATING RACK

Bruce Evans Wallace, 1819 Robinhood Rd., Winston-Salem, N.C. 27104

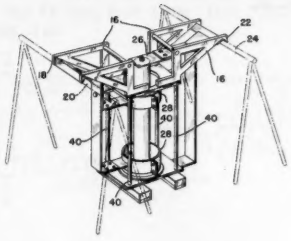
Filed June 4, 1973, Ser. No. 366,420

Int. Cl. B01k *3/00*; **C22d** *1/02*; **C23b** *5/70*

U.S. Cl. 204—272 **2 Claims**

1. A plating and stripping rack for electroplating and cleaning the interior of hollow substantially cylindrical objects in a plating bath comprising: a support frame having two complementary sections, each of said sections having two winged - members; an anode formed by one of said complementary frame sections; a cathode formed by the other of said complementary frame sections and positioned a fixed preselected distance from said anode by said frame; and a cylindrical

insert having first and second ends and being of a composition dissimilar to the cylindrical object being plated for placement within the hollow cylindrical object affixed to said anode ends and forming a part thereof, said cathode having clamping



means for securing the object to be plated, said frame including insulating means separating and maintaining said anode and cathode, and said insulating means including an upper and lower insulating plate maintaining said anode and said cathode in a fixed relationship each with the other.

3,888,756

APPARATUS FOR TREATING WATER CONTAINING IMPURITIES

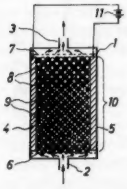
Toru Teshima, Hadano; Toshiie Nagasao, Machida; Minoru Tanaka Hachioji; Kazuo Ariga, and Kiyoshi Inoue, both of Tokyo, all of Japan, assignors to Stanley Denki Kabushiki Kaisha, Tokyo, Japan and Kabushiki Kaisha Inoue Japax Kenkyusho, Kanagawa, Japan

Filed July 23, 1973, Ser. No. 381,409

Claims priority, application Japan, July 28, 1972, 47-75754; July 26, 1972, 47-74875

Int. Cl.[2] B01D *13/02;* **C02B** *1/82;* **C02C** *5/12*

U.S. Cl. 204—275 **13 Claims**



1. An apparatus for treating water containing impurities, comprising:

an electrolytic cell;

at least one pair of main electrodes opposed in the electrolytic cell;

a power source connected to the main electrodes;

a plurality of auxiliary electrodes disposed in pieces between the main electrodes; and

holder means of nonconductive materials in particulate form employed for insulating said auxiliary electrodes thereamong to uniformly arrange in a mutually close relationship so as to avoid any short circuit between said main electrodes.

3,888,757

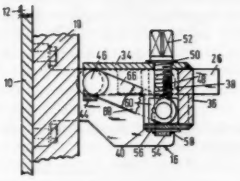
ANODE ROD CLAMPING ASSEMBLY

Johannes Roukema, Vleuten, and Frederik Noordegraaf, Leerdam, both of Netherlands, assignors to B. V. Nederlandse Kraanbouw Maatschappij, Utrecht, Netherlands

Filed June 7, 1973, Ser. No. 367,884

Int. Cl. C23b *5/70*

U.S. Cl. 204—297 R **3 Claims**



1. An anode rod clamping assembly for allowing vertical adjustment as well as removal and replacement of an anode rod of an electric furnace device having a bus bar to which the anode rod is clamped when in operation, said assembly comprising the combination of:

a pair of spaced and horizontally projecting support brackets having forward ends adapted to be fixed in straddling relation to the area of a bus bar against which an anode rod is to be clamped and held;

a frame having means selectively engaging said support brackets for supporting the frame fixedly between said brackets while allowing vertical movement and complete separation of the frame from the brackets; and

clamp means captive in said frame for clamping an anode rod against a bus bar and including a vertically extending screw thread member to enable both the complete separation of the frame from the brackets and operation of the clamp means;

said clamp means including a clamp bar and said frame including guide means towards the forward ends of said brackets for horizontally guiding said clamp bar into and out of engagement with an anode rod;

said frame including a vertical reaction surface disposed in rearwardly spaced relation to said guide means, and said clamp means including a carrier engaged by said screw thread member and disposed against said reaction surface, and link means which connects said carrier to said clamp bar, said link means being movable in response to movement of said carrier to increase its angularity with respect to said reaction surface, as said clamp bar moves horizontally in said guide means to clamp an anode rod, toward a disposition in which it is perpendicular thereto.

3,888,758

APPARATUS FOR LARGE SCALE GEL ELECTROPHORESIS

Sheik Arshad Saeed, 9 Rostrevor Rd., London, S.W. 19, England

Filed June 28, 1973, Ser. No. 374,475

Int. Cl. B01k *5/00*

U.S. Cl. 204—299 **11 Claims**

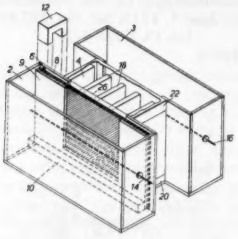
1. In apparatus for gel electrophoresis, the combination comprising:

wall means defining at least one gel chamber;

an electrode chamber adjacent one end of said gel chamber;

an elution compartment connected between said gel chamber and electrode chamber;

means for causing an eluting liquid to flow through said elution compartment;



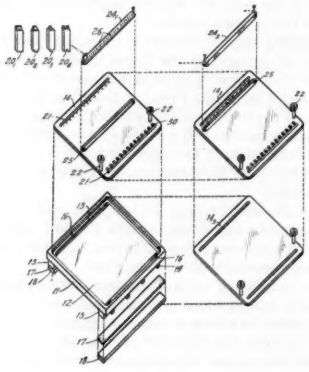
and means for agitating the eluting liquid in said elution compartment.

3,888,759

FLAT PLATE ELECTROPHORESIS

David Elson, and Shlomo Avital, both of Rehovot, Israel, assignors to Yeda Research & Development Co., Ltd., Rehovot, Israel

Filed May 25, 1973, Ser. No. 363,961
Int. Cl. B01k *5/00*
U.S. Cl. 204—299 **7 Claims**



1. A device for horizontal flat plate electrophoresis comprising in combination,

a horizontal plate having an upper and a lower surface and surrounded by lateral walls, the upper surface of the plate and the lateral walls defining a rectangular gel bed;

a step of predetermined height in each of the lateral walls thereby defining a ledge;

a cover adapted to rest on the ledge and thereby define the thickness of the gel bed;

a plurality of holes in the cover for the insertion of templates during polymerization of the gel to define predetermined holes of predetermined volume in the gel and for insertion of samples of predetermined volume in the holes;

two legs attached to the lower surface of the plate at opposing sides thereof and coextensive with the sides to which the legs are attached; and

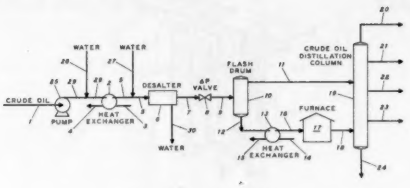
a slot through the plate positioned over each leg, extending for the full length of the leg, and extending through the entire height of the leg.

3,888,760

AVOIDING HEAT EXCHANGER FOULING AFTER CRUDE OIL DESALTING

Wayne A. Ebert, Dublin, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 184,738, Sept. 29, 1971, abandoned. This application Jan. 26, 1973, Ser. No. 326,615
Int. Cl. C10g *17/00*
U.S. Cl. 208—48 **8 Claims**



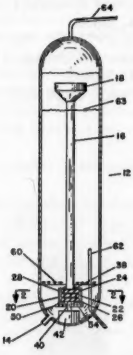
1. In a process which comprises heating and desalting and then further heating hydrocarbonaceous oil using heat exchangers and a desalter, the improvement which comprises flashing the oil to remove water after desalting the oil and before further heating of the oil in any heat exchanger.

3,888,761

H-OIL PROCESS

Norman C. Stewart, Lake Charles, La., assignor to Cities Service Research & Development Co., New York, N.Y.

Continuation-in-part of Ser. No. 88,764, Nov. 12, 1970, abandoned. This application June 20, 1973, Ser. No. 371,792
Int. Cl. C10g *1/08, 13/00*
U.S. Cl. 208—112 **7 Claims**



1. A method for catalytically treating a hydrocarbon comprising

passing a heavy hydrocarbon oil feedstock upwardly through a particulate hydrorefining catalyst bed in a reaction zone, said particulate catalyst being at least one-sixty-fourth inch in size,

recycling a portion of the upwardly flowing oil together with a minor portion of the particulate catalyst to the bottom of the reaction zone,

simultaneously pulverizing at least a portion of the recycled particulate catalyst to a fine powder in the size range of between about 300 and about 600 microns,

passing the recycled oil and finely powdered catalyst upwardly through the reaction zone, and

removing an effluent stream of treated oil and powdered catalyst from the reaction zone.

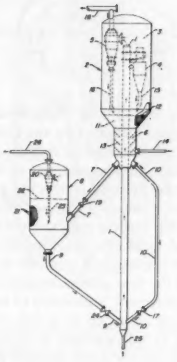
3,888,762
FLUID CATALYTIC CRACKING PROCESS

Clarence G. Gerhold, Palatine, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 297,170, Oct. 12, 1972, abandoned, which is a continuation-in-part of Ser. No. 139,433, May 3, 1971, abandoned. This application Apr. 12, 1973, Ser. No. 350,665

Int. Cl. B01j 9/20; C10g 11/18, 37/02

U.S. Cl. 208—120 8 Claims



1. A fluid catalytic cracking process in which the activity of a catalyst blend which contacts a hydrocarbon feed is controllable to produce a desired product yield structure which process comprises the steps of:

a. contacting a hydrocarbon feed stream with catalyst blend, comprising a freshly regenerated catalyst stream from a regeneration zone and a separate recycle spent catalyst stream withdrawn from a spent catalyst stripping zone, in a short-time dilute-phase riser reaction zone;

b. passing the feed and catalyst blend in admixture through said reaction zone at catalytic cracking conditions, including the deposition of coke on the catalyst blend, to form spent catalyst and product components;

c. discharging the mixture into a separation zone at separation conditions to effect the separation of catalyst from product components and any unreacted feed;

d. recovering product and any unreacted feed and passing spent catalyst from said separation means into a spent catalyst stripping zone at stripping conditions to remove adsorbed and interstitial hydrocarbons therefrom to form stripped spent catalyst containing coke thereon;

e. passing a first portion of stripped spent catalyst from said stripping zone into a regeneration zone maintained at oxidizing conditions and therein oxidizing coke from said catalyst to produce freshly regenerated catalyst;

f. passing freshly regenerated catalyst from said regeneration zone to said riser of step (a) above; and,

g. passing simultaneously a second portion of stripped spent catalyst from the stripping zone into said riser as the separate recycle spent catalyst stream of step (a) above at a rate to control the activity of the catalyst blend necessary to produce a desired yield structure.

3,888,763
HYDROCARBON CONVERSION WITH A SULFIDED BIMETALLIC CATALYTIC COMPOSITE

Frederick C. Wilhelm, Arlington Heights, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 233,819, March 10, 1972, Pat. No. 3,798,155. This application Feb. 11, 1974, Ser. No. 441,198

Int. Cl. C10g 35/08; B01j 11/74

U.S. Cl. 208—139 13 Claims

1. A process for reforming a gasoline fraction to produce a high octane reformate which comprises contacting said fraction, at gasoline reforming conditions in the presence of hydrogen with a catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.05 to about 1 wt. % sulfur, about 0.1 to about 3.5 wt. % halogen and bismuth in an amount sufficient to result in an atomic ratio of bismuth to platinum group metal of about 0.1:1 to about 1:1, wherein the platinum group metal and bismuth are uniformly dispersed throughout the porous carrier material and wherein substantially all of the platinum group metal and bismuth are present in the corresponding elemental metallic states.

3,888,764
CATALYST PURGING TECHNIQUE IN AN ON-STREAM CATALYST REGENERATION PROCESS

Arthur R. Greenwood, Niles, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 194,030, Oct. 29, 1971, abandoned. This application July 30, 1973, Ser. No. 383,753

Int. Cl. B01j 11/02

U.S. Cl. 208—140 5 Claims

1. In a hydrogenative hydrocarbon conversion process, having an on-stream oxidative catalyst regeneration system, wherein catalyst particles are withdrawn from a hydrocarbon conversion zone and transported to said catalyst regeneration system, and withdrawn from said regeneration system and transported to a hydrocarbon conversion zone, the method of purging volatile material from said catalyst particles, in a purging zone, prior to the transport thereof to said regeneration system, or to said hydrocarbon conversion zone, which method comprises the sequential steps of:

a. introducing said catalyst particles into said purging zone and establishing therein a first static pressure level;

b. introducing an inert gaseous medium into said purging zone while simultaneously increasing the static pressure to a predetermined, second level, over a time period in the range of about 10 to about 60 seconds also simultaneously venting volatile material and said inert gaseous medium from said purging zone;

c. when said predetermined, second static pressure level is attained, ceasing the flow of said inert gaseous medium;

d. continuing the venting of volatile material and inert gaseous medium while said static pressure decreases to said first pressure level over a time period in the range of about 10 to about 60 seconds; and,

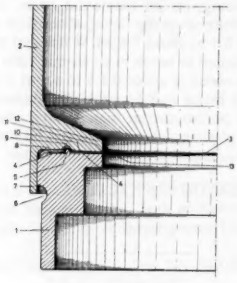
e. repeating the sequence of steps (b), (c) and (d) from 1 to about 6 times;

said method being further characterized in that said first and second static pressure levels are attained throughout the sequential steps without effecting fluidization of said catalyst particles in said purging zone, said first static pressure level being in the range of about 0 to about 5 psig. and said second static pressure level being in the range of about 5 to about 20 psig.

3,888,765
PRECISION OR MICRO SIEVE STRUCTURE

Fredrik Willem Bolk, Eerbeek, Netherlands, assignor to Veco Zeefplatenfabriek B. V., Netherlands

Filed May 17, 1973, Ser. No. 361,056
Claims priority, application Netherlands, May 18, 1972, 7206758
Int. Cl. B07b *1/46*
U.S. Cl. 209—352 5 Claims



1. A precision micro structure comprising two annular bodies axially aligned with each other and connected together, a flexible sieve surface mounted therebetween, an annular portion of the sieve surface being in contact with a bordering shoulder on each of the annular bodies, each bordering shoulder being substantially perpendicular to the axis of rotation of the annular bodies, the improvement comprising an annular groove on one bordering shoulder, an annular land on the other bordering shoulder axially aligned with the annular groove and adapted to fit therein, the opening of the groove being greater than the sum of the width of the land and twice the thickness of the sieve, and the depth of the groove being greater than the sum of the height of the land and the thickness of the sieve, whereby the annular portion of the sieve surface is clamped between the bordering shoulders of the annular bodies except in the region of the land and groove.

3,888,766
OIL SORPTION MATERIAL

Wayne J. De Young, Argos, Ind., assignor to Uniroyal, Inc., New York, N.Y.

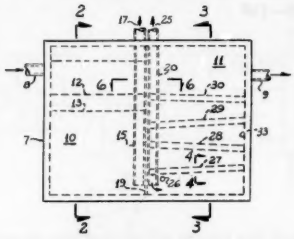
Filed Mar. 9, 1973, Ser. No. 340,613
Int. Cl. E02b *15/04*
U.S. Cl. 210—36 11 Claims

1. A composition of matter for selectively absorbing oil from a surface supporting the same, comprising a polyurethane foam compressed to a thickness of about 7 percent of the starting thickness, said foam having a multiplicity of open cells or capillary domains therein and being impregnated with between about 4 and 20 percent by weight, based on the weight of the starting foam, of a sealant of natural rubber, said sealant coating the surface of said cells or capillary domains of said compressed foam and thereby minimizing the capability of said foam to absorb water when exposed thereto while maximizing the capability of said foam to absorb oil when exposed thereto, and said sealant also serving as a binder to retain said compressed foam in its compressed state until said sealant is dissolved or swelled by oil upon being contacted thereby.

3,888,767
SEWAGE TREATMENT TANK

Paul D'Aragon, 525 Stuart Ave., Outremont, Quebec, Canada

Continuation-in-part of Ser. No. 872,521, Oct. 30, 1969, abandoned. This application Sept. 27, 1971, Ser. No. 184,168
Int. Cl. C02c *1/04, 1/16*
U.S. Cl. 210—151 3 Claims



1. A sewage treatment tank in which sewage is subjected to the action of anaerobs followed by the action of aerobs, the tank comprising in combination, a first digester compartment having a sewage entrance and adapted to digest solid sewage by action of anaerobs thereby producing gases, an open bottom lander disposed in said first compartment spaced inwardly from the walls parallel thereto and adapted to separate sewage into solid and liquid, a gas exit pipe for said first compartment, a second digester compartment, conduit means for conveying liquid sewage from the first compartment to the lower portion of the second compartment, a plurality of inverted trays in the second compartment arranged in series, one above another, each tray slanting in an opposite direction relative to and overlapping the tray immediately beneath it, means for injecting air into the second compartment below the lowermost tray whereby to digest liquid sewage by aerobs and produce gases, each slanted tray including a set of inverted cups adapted to bubble air from lower cups to upper cups of each tray and an aperture in an upper cup of each tray through which aperture the air bubbles from the upper cups of each tray to lower cups of the next higher tray, an exit pipe for evacuated gases and excess air provided on the second compartment, and an effluent discharge provided on the second compartment.

3,888,768
OIL RECTIFIER, APPARATUS WITH PROCESS

Paul J. Graybill, 61 Sunset Hill Dr., Pine Orchard, Conn. 06405

Filed June 15, 1973, Ser. No. 370,282
Int. Cl. B01d *43/00*
U.S. Cl. 210—223 7 Claims

1. A liquid rectifying apparatus for the catalyzing, neutralizing, trapping, and finally removing or otherwise destroying the dispersed-phase from the continuous phase of a contaminated liquid dispersion, particularly industrial oils and lubricating oil in use in a motor, said dispersed-phase consisting of both soluable and insoluable contaminants such as sand, dirt, metal particles, carbon, acid, sulphur, gums, resins, ash, water, coolant, and other foreign materials of molecular and larger sizes all of which are widely dispersed in said oil and part of which are ionized, said apparatus comprising:

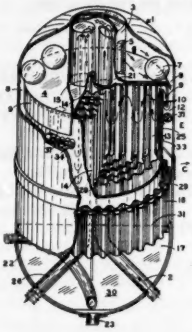
a generally cylindrical pressure tight casing having a generally vertically extended longitudinal axis,

an essentially medial fully cross-sectional honeycomb-like foraminous partition horizontally oriented in said casing, said foraminous partition being comprised of essentially non-porous material having said foramina essentially vertical therein and cooperating with the upper portions of said confined area in said casing to define generally an upper fully cross-sectional circulating area and with the

lower portion of said confined area in said housing to define a bottomly positioned fully cross-sectional sludge sump, said foramina being so deposed as to allow contaminants to settle therethrough, moving from said circulating area into said sump;

inlet means mounted in said housing for introducing contaminated oil into a circulating chamber in the upper portion of said circulating area, said inlet means disposed so as to establish whirling flow of said oil within said circulating chamber to generate forces for displacing said heavy contaminants generally outwardly within said circulating chamber;

a series of concentric attractor baffles extending upwardly from said foraminous partition into the lower portion of said circulating area, said baffles being corrugated and



having perforations therethrough, said baffles defining impingement surfaces for said coarse or ionized colloidal contaminants to facilitate the separation by sedimentation, electrostatic attraction, and cohesive bonding of said contaminants;

a doughnut shaped circulating chamber positioned about said concentric attractor baffles being defined by said baffles on its inner limits, by said housing on the outer and upper limits and said foraminous partition at its lower limits;

outlet means mounted in said housing generally centrally of said circulating chamber for removing said continuous phase oil after the separation of said dispersed-phase contaminants;

said sludge sump for receiving said settling contaminants after they have passed through said foraminous partition; outlet and inlet flow tubes centrally positioned and fully extended between the housing in said sump to the exact top of said circulating area thus preventing any appreciable drainback of said liquid when the system is not in operation since both the outlet and the inlet tube endings are well within the upper limits of said casing;

a centrally located louvered cap positioned above and a but the upper ends of said outlet tubes, said cap being articulated at its lower periphery to the floor of said circulating chamber, said floor also having at its outer periphery a downwardly extending flange thereabout, said louvers which are positioned in the side wall of said cap being so deposed as to set up acute centrifugal movement in the liquid entering said circulating chamber;

a flanged outlet cone positioned within said louvered cap and over and about said outlet tube, said flange extending outwardly on all sides contacting the lower surface of the floor of said circulating chamber chamber forming a seal therewith, thus creating a pressured inlet chambaer within said louvered cap;

said circulating chamber being defined on the lower portion by a floor, on its outer and upper portion by the walls of the casing and on its inner portion by the wall of said louvered cap, this configuration constituting a ball race having during operation extreme centrifugal movement in the liquid therein which enters the louvers and escapes downwardly about the outer periphery of the floor thereof, said ball race floor being positioned on said attractor baffles;

said ball race having a number of self cleaning inarticulated balls contained therein, said balls being constituted of various metal alloys having neutralizing and catalyzing properties inherent therein, said balls during operation being violently rolled about said race, keeping them highly polished thus assuring their reacting capabilities;

an anti-turbulance baffle of three or more blades positioned fully across the sump thereof extending fully upwardly to become the support means of the attractor element, but not extending completely to the lower extremity of the sump but resting on the curved side walls thereof;

draining means in said housing in said sump area to facilitate the removal of said contaminants.

3,888,769

SECURING DEVICE FOR PRESS DIAPHRAGMS IN PLATE FILTER PRESSES

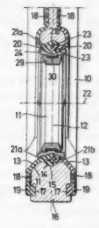
Alfons Schotten, and Franz Heimbach, both of Duren, Germany, assignors to Eberhard Hoesch & Sohne, Duren, Germany

Filed Jan. 2, 1974, Ser. No. 429,769

Claims priority, application Germany, May 17, 1973, 2324876

Int. Cl. B01d *25/12*

U.S. Cl. 210—227 **12 Claims**



1. In an arrangement composed of a filter plate and a press diaphragm, a device for the fluid tight securing of the press diaphragm to the filter plate in the zone of a slurry inlet bore provided in the filter plate, the bore having an axis, the diaphragm extending along the filter plate and has an opening in alignment with the inlet bore, comprising in combination:

a. means defining an annular groove in said filter plate, said groove surrounding said inlet bore and arranged coaxially therewith;

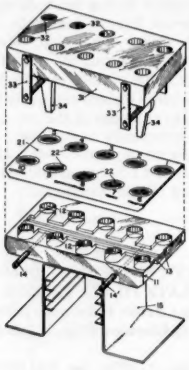
b. a skirt forming part of said diaphragm, said skirt bounding and surrounding said opening in said diaphragm and extending axially into said inlet bore of said filter plate, said skirt having an annular terminal enlargement surrounding said bore axis and conformingly received in said groove, said terminal enlargement having a projecting portion extending radially away from said groove towards said bore axis; and

c. a split ring disposed in said bore coaxially with said axis, said split ring including means defining an outer peripheral annular groove, said projecting portion of said terminal enlargement being conformingly received in and supported by said peripheral annular groove in said split ring.

3,888,770
PLURAL-SAMPLE FILTER DEVICE

Shlomo Avital, 15 Bussel St., Rehovot; Menahem Silbermann, 78-Shikun Haamami, Ness-Ziona, and David Elson, 9 Meonot Shine, Rehovot, all of Israel

Filed Oct. 21, 1971, Ser. No. 191,164
Int. Cl. B01d 25/02
U.S. Cl. 210—238 1 Claim

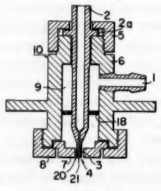


1. A plural-sample filter device, comprising, a base plate; a filter plate; a cover plate; and means for holding said plates together in superposed position with the filter plate interposed between the base plate and the cover plate; said cover plate being provided with a plurality of individual openings for introducing therethrough the samples to be filtered; said filter plate being provided with a plurality of filter areas corresponding to the number of, and aligned with, the openings in said filter plate, each of said filter areas being adapted to receive a filter; said base plate being provided with a plurality of receptacles corresponding to the number of, and aligned with, the filter areas in said filter plate; said base plate also being formed with an outlet and channel means connecting said receptacles to said outlet, the said filter plate having downwardly bent sides enabling it to be used as a stand when removed from the device, the width of the unbent portion of the filter plate being substantially of the same length as the width of the base and cover plates.

3,888,771
HOLLOW FIBERS OF CUPRAMMONIUM CELLULOSE AND A PROCESS OF THE MANUFACTURE OF SAME

Masami Isuge; Shinichi Uematsu; Yotsuo Ono; Shokichi Eiga, and Minoru Makita, all of Nobeoka, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed May 31, 1973, Ser. No. 365,500
Claims priority, application Japan, June 2, 1972, 47-54291; May 9, 1973, 48-51410
Int. Cl. B01d 31/00
U.S. Cl. 210—500 M 7 Claims



1. A dialyzing hollow fiber of cuprammonium regenerated cellulose having a smooth, skinless inner and outer wall surface and said wall having distributed throughout its thickness a netlike structure of passage routes, the routes having a diameter of not greater than 200, and said fiber having been prepared by the steps of

extruding a spinning liquor of cuprommonium regenerated cellulose to form a hollow core extrudate and simultaneously therewith passing a non-coagulating organic solvent through the hollow core;

passing the resulting extrudate through a gaseous atmosphere whereby the weight of said extrudate causes stretching to substantially reduce the outer diameter thereof;

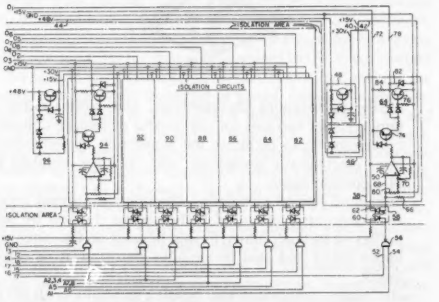
coagulating the hollow core extrudate by contacting said extrudate with a solution containing aqueous sodium hydroxide to form a hollow core fiber having a smooth, skinless inner and outer wall; and

rinsing and drying the resulting fiber.

3,888,772
COMMUNICATION BETWEEN REDUNDANT PROTECTION AND SAFEGUARDS LOGIC SYSTEMS WITHIN NUCLEAR REACTOR POWER PLANTS BY MEANS OF LIGHT

James A. Neuner, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 4, 1972, Ser. No. 240,938
Int. Cl. H04b 9/00
U.S. Cl. 250—199 9 Claims



1. An improved nuclear reactor protection and safeguard system having a plurality of sensors for monitoring reactor and environmental parameters associated with reactor operations, the sensors respectively providing an output representative of the monitored parameters which is communicated along two similar, electrically and physically isolated signal trains of logic to corresponding separate, redundant logic circuits which interpret the respective monitored signals and upon the occurrence of a predetermined combination thereof independently activate corresponding control and protection mechanisms associated with the reactor to control and protect against the occurrence of an adverse reactor operating condition, wherein the improvement comprises light communication means for effecting transmission between logic trains of the information contained therein while maintaining the electrical integrity of each train including:

light generative means, independently responsive to the logical information conveyed by each of the isolated logic signal trains to radiate a separate, corresponding representative light output indicative thereof; and

light receiving means independently responsive to the light output representative of each of the logic signal trains to respectively reproduce the logical information represented thereby in electrical form for communication to the other of the two trains while maintaining electrical isolation between trains and thus the integrity and independence of each train.

3,888,773

NITROGEN COMPOUNDS LINKED TO A HETEROCYCLIC RING AS MULTIFUNCTIONAL ADDITIVES IN FUEL AND LUBRICANT COMPOSITIONS

John C. Nnadi, Glassboro, and Israel Joel Heilweil, Princeton, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 27, 1972, Ser. No. 248,226
Int. Cl. C10m *1/24, 1/32;* C10l *1/14*
U.S. Cl. 252—37.2 4 Claims

1. An organic composition comprising a major proportion of an organic fluid lubricant or fuel medium and a minor proportion sufficient to provide detergent antioxidant or antiwear properties thereto of tri-substituted pyrimidine, wherein each substituent is a bis-polyalkenylsuccinimide the amine of the bis-polyalkenylsuccinimide being an alkylene polyamine of the formula $H_2N—(C_mH_{2m}NH)_eH$ wherein *m* is 1 to 3 and *e* is 2 to 10 and the polyalkenyl group having from 8 to about 300 carbon atoms, said substituent being linked to the pyrimidine through a basic nitrogen atom of the substituent.

3,888,774

WOOD TREATING SOLUTION CONTAINING CREOSOTE AND ANTIMONY

Woodrow E. Kemp, Pittsburgh, Pa., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Division of Ser. No. 221,082, Jan. 2, 1967, Pat. No. 3,764,378. This application July 16, 1973, Ser. No. 379,267
Int. Cl. C07f *9/68, 9/90, 9/92;* B27k *3/50*
U.S. Cl. 252—8.1 2 Claims

1. A wood treating composition comprised of creosote having dissolved therein 1-(bis(2-hydroxypropyl)nitriloethylene)-5-stiba-1-aza-4,6-dioxacyclooctyl Sb-ether.

3,888,775

OIL COMPOSITION FOR SYNTHETIC STAPLE FIBERS

Yukimichi Koizumi; Yoshihiro Kobayashi, both of Mihara; Yasuhiro Murase, and Takamitsu Kondo, both of Matsuyama, all of Japan, assignors to Teijin Limited, Osaka, Japan

Filed Jan. 24, 1973, Ser. No. 326,452
Claims priority, application Japan, Jan. 29, 1972, 47-010756
Int. Cl. D06m *11/00*
U.S. Cl. 252—8.8 7 Claims

1. An oil for use in synthetic staple fibers, said oil consiting essentially of (a) 10–40 percent by weight of a monobasic acid ester or dibasic acid ester of a monohydric or polyhydric alcohol, (b) 10–40 percent by weight of a reaction product formed between 2 mols of a fatty acid containing 8–22 carbon atoms and 1 mol of polyethylene polyamine and having the formula

$$R_1CONH(CH_2CH_2NH)nCOR_2$$

wherein each of R_1 and R_2 is a hydrocarbon radical having 7–21 carbon atoms and *n* is an integer, (c) 10–30 percent by weight of an antistatic agent and (d) 10–70 percent by weight of an emulsifying agent other than (a) and (b) above.

3,888,776

TWO-CYCLE ENGINE OIL

Joseph J. Silverstein, Long Island City, N.Y., assignor to The Ore-Lube Corporation, New York, N.Y.

Filed Feb. 12, 1973, Ser. No. 331,488
Int. Cl. C10m *3/02;* C10l *1/10*
U.S. Cl. 252—25 10 Claims

1. A two-cycle engine lubricant composition which consists essentially of a polypropylene glycol concentration in the range of about 85 to about 97.5%, by volume, a sulfurized oxymolybdenum hydrocarbylphosphorodithioate in the concentration of about 0.85 to about 7.0 percent, by volume, a finely-divided molybdenum disulfide in the concentration of about 0.15 to about 0.63 percent, by volume, and a halogenated hydrocarbon detergent film strength improver in the concentration of about 1.0 to about 6.6 percent, by volume, all of the percentages being based upon the total volume of the polypropylene glycol-based lubricant composition.

3,888,777

HEAT TRANSFER AGENTS

Larry L. Jackson; Walter F. Seifert, and Daniel E. Collins, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Apr. 2, 1971, Ser. No. 130,839
Int. Cl. C09k *3/02*
U.S. Cl. 252—73 10 Claims

1. A composition of matter of, by volume,
5 to 90 percent of diphenyl oxide,
5 to 50 percent of biphenyl and
5 to 90 percent of biphenylyl phenyl ether.

3,888,778

BRIGHT DIP COMPOSITION FOR TIN/LEAD

Merton Beckwith, Rt. 74, R.F.D. 4, Rockville, Conn. 06066, and Grace F. Hsu, Scully Rd., Somers, Conn. 06071

Filed Mar. 13, 1973, Ser. No. 340,912
Int. Cl. C09k *3/00*
U.S. Cl. 252—79.3 7 Claims

1. A composition for bright dipping tin/lead alloys on a workpiece having exposed surfaces of copper or gold without contamination thereof comprising an aqueous solution, on a per liter basis, of:

A. about 50–250 grams of an acidic compound selected from the group consisting of fluoboric acid, tartaric acid, sulfamic acid, phenylsulfonic acid, gluconic acid, the ammonium and alkali metal salts thereof, and mixtures thereof;

B. about 15–50 grams of a thiourea compound selected from the group consisting of thiourea and mono- and di-N-substituted thioureas and mixtures thereof; and;

C. about 0.5–20 grams of a stabilizer selected from the group consisting of trichloroacetic acid, the ammonium and alkali metal salts thereof, and mixtures thereof;

said solution having a pH of about 0.2 to 3.0.

3,888,779

FLAME RETARDANT COMPOSITION CONTAINING TETRAKIS (HYDROXYMETHYL) PHOSPHONIUM OXALATE

Tsai Hsiang Chao, Somerville, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Dec. 26, 1972, Ser. No. 317,998
Int. Cl. B27k *3/00*
U.S. Cl. 252—8.1 4 Claims

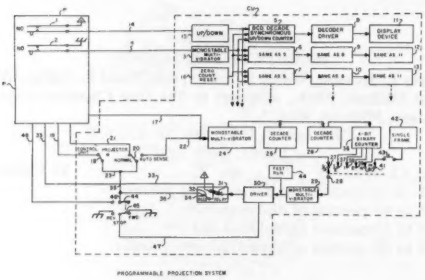
1. An aqueous flame retardant finish composition solution for cellulosic textile materials comprising:

tetrakis(hydroxymethyl) phosphonium oxalate and at least one organic nitrogenous compound having a trivalent nitrogen bearing at least 2 members comprised of hydrogen atoms and methylol groups, or mixtures thereof wherein the ratio of nitrogen of the nitrogenous compounds to phosphine-derived phosphorus on a parts by weight basis is between 0.5 and 5.0.

3,888,780
PROGRAMMABLE PROJECTION SYSTEM

Donald Spencer Tucker, 9216 S.W. Grane Ln., Portland, Oreg. 97225

Continuation of Ser. No. 272,560, July 17, 1972, abandoned. This application Nov. 23, 1973, Ser. No. 418,333
Int. Cl. G03b 21/48
U.S. Cl. 352—92 8 Claims



PROGRAMMABLE PROJECTION SYSTEM

1. A system for projecting film having a series of frames, said system having a projection station, means for generating signals of a predetermined frequency,

frequency dividing means responsive to the signals of said predetermined frequency for producing signals of lower frequency in its output,

drive means for intermittently feeding successive film frames to said projection station at intervals corresponding to the frequency signals applied thereto and,

means for selectively applying said signals of predetermined frequency or said signals of lower frequency to said drive means, whereby the film frames are fed to the projection station at intervals corresponding to the predetermined signal frequency or lower signal frequency.

3,888,781
PROCESS FOR PREPARING A GRANULAR AUTOMATIC DISHWASHING DETERGENT COMPOSITION

Gary W. Kingry, and Frank H. Lahrman, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Sept. 5, 1972, Ser. No. 286,654
Int. Cl. C11d 7/54
U.S. Cl. 252—99 10 Claims

1. A process for producing a crisp, free-flowing agglomerated granular detergent composition comprising the steps of:

a. charging to a mixing zone particulate matter comprising an alkaline builder salt;

b. agitating the particulate matter in the zone; and

c. with continuous agitation spraying onto the particulate matter a liquid mixture having a temperature of from 110°F. to 200°F. of an alkali metal silicate having a SiO_2.:alkali metal oxide ratio of from 3.2:1 to 2.5:1 and a nonionic detergent wherein the ratio of liquid alkali metal silicate to nonionic detergent ranges from 3:1 to 6:1 and wherein the liquid mixture is sprayed on at a level of from 25% to 50% based on the total composition to form said agglomerated granules.

3,888,782
SOFT CONTACT LENS PRESERVING SOLUTION

Malcolm P. Boghosian, Long Beach, and Milagros V. Blanco, Yorba Linda, both of Calif., assignors to Allergan Pharmaceuticals, Irvine, Calif.

Filed May 8, 1972, Ser. No. 250,931
Int. Cl. C11d 3/48
U.S. Cl. 252—106 7 Claims

1. A sterile, non-toxic cleaning and sterilizing solution for plastic hydrophilic soft contact lenses comprising about 0.001 to about 0.05% chlorhexidine and about 0.5 to about 5% polyvinylpyrrolidone.

3,888,783
CLEANER FOR TIN PLATED FERROUS METAL SURFACES, COMPRISING PHOSPHATE, SILICATE AND BORAX

Edward A. Rodzewich, Flourtown, Pa., assignor to Amchem Products, Inc., Ambler, Pa.

Filed Oct. 10, 1973, Ser. No. 405,187
Int. Cl. C11d 3/06, 3/08
U.S. Cl. 252—135 7 Claims

1. A cleaning composition which when added to water forms an aqueous solution for cleaning tin-plated ferrous metal surfaces, consisting essentially of an alkali metal metasilicate, a condensed phosphate selected from the group consisting of tripolyphosphate and pyrophosphate, and borax, wherein for each part by weight of borax in said composition there is from about 0.1 to about 0.5 parts by weight of alkali metal metasilicate and from about 0.1 part to about .6 parts by weight of condensed phosphate.

3,888,784
ELECTROCHEMICAL LUMINESCENT COMPOSITION

Albert Pighin, and Douglas Peter Malanka, both of Ottawa, Ontario, Canada, assignors to Northern Electric Company Limited, Montreal, Quebec, Canada

Filed Nov. 29, 1972, Ser. No. 310,249
Int. Cl. C09k 3/00
U.S. Cl. 252—188.3 CL 10 Claims

1. A process for preparing a solution for an electrochemical luminescent cell, the solution comprising an aprotic solvent, a fluorescor dissolved in the solvent, the fluorescor selected from rubrene and 9, 10 - diphenylanthracene, and an electrolyte, the electrolyte an alkyl perchorate;

wherein the fluorescor is dissolved in hot xylene and the resultant solution filtered while hot into methanol at room temperature to recrystallize the fluorescor, the resultant mixture then filtered to separate the recrystallized fluorescor, the dissolving, filtering into methanol, recrystallization and filteration carried out at least two times, and finally vacuum drying the recrystallized fluorescor in a nitrogen atmosphere.

3,888,785
INORGANIC SALTS AS INHIBITORS FOR TETRAKISDIMETHYLAMINO ETHYLENE-WATER CHEMICAL INTERACTION

Alfred F. Tatyrek, Maplewood, and Burton Werbel, West Orange, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Continuation of Ser. No. 69,141, Sept. 2, 1970, abandoned. This application Dec. 22, 1972, Ser. No. 317,588
Int. Cl. C09k 1/02
U.S. Cl. 252—188.3 CL 9 Claims

1. A process for increasing the storage stability of a chemiluminescent composition containing TMAE and water in the absence of oxidizing and dehydrating agents, which comprises incorporating therein a water-soluble, inorganic alkali metal salt.

3,888,786
CHLORINATED BIS(PHENYLETHYNYL)ANTHRACENES AS FLUORESCERS IN CHEMILUMINESCENT SYSTEMS

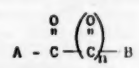
Donald Roy Maulding, Branchburg Township, Somerset County, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Continuation of Ser. No. 261,888, June 12, 1972, abandoned. This application Nov. 23, 1973, Ser. No. 418,493

Int. Cl. C09k *3/00*

U.S. Cl. 252—188.3 CL **10 Claims**

1. A chemiluminescent composition for reaction with a hydroperoxide to obtain chemiluminescent light, said composition comprising (1) an ester of the formula:



where A and B represent aliphatic or aromatic ester groups, and *n* is an integer at least one, (2) a fluorescer comprising a bis(phenylethynyl)anthracene substituted by chloro, fluoro or lower alkyl, and (3) an organic solvent, said ingredients being present in sufficient concentration to obtain chemilinescence when reacted with hydrogen peroxide.

3,888,787
METHOD OF PRODUCING BALL-SHAPED METALLIC OXIDE OR METALLIC CARBIDE PARTICLES

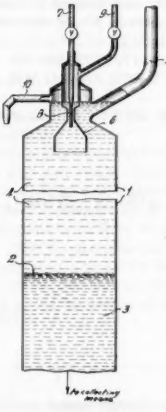
Kurt Hein, and Erich Zimmer, both of Julich, Germany, assignors to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung, Julich, Germany

Filed Sept. 11, 1972, Ser. No. 288,098

Claims priority, application Germany, Sept. 23, 1971, 2147472

Int. Cl. G21c *21/00*

U.S. Cl. 252—301.1 S **8 Claims**



1. A method of producing ball-shaped particles in a column, said particles being selected from the group consisting of metallic oxides and metallic carbides, which includes the steps of: introducing an organic phase into said column, said organic phase being one selected from the group consisting of ketones and ketone mixtures, which at room temperature have a dissolving power for water not greater than four per cent by weight at room temperature and a viscosity between one half and twice that of water said ketones and ketone mixtures containing a water quantity below that of ketones and ketone mixtures in equilibrium with ammonia; introducing an aqueous ammonia phase into said column, said aqueous ammonia phase having a higher specific gravity than said organic phase, thus settling below the latter; dropwise introducing into said organic phase an aqueous solution, said solution being one of a material selected from the group consisting of metallic nitrate, metallic chloride, mixtures of metallic nitrates and metallic chlorides, and colloidal solutions of metallic nitrates and metallic chlorides; and collecting the resulting particles.

3,888,788
PREPARATION OF STANNIC OXIDE AQUASOLS AND ORGANOSOLS

Paul Clifford Yates, Wilmington, Del., assignor to E. I. du Pont de Nemours & Company, Wilmington, Del.

Continuation-in-part of Ser. No. 93,862, Nov. 30, 1970, abandoned. This application Nov. 2, 1972, Ser. No. 303,208

Int. Cl. B01j *13/00*

U.S. Cl. 252—309 **13 Claims**

1. A method for making a positively charged stannic oxide aquasol which comprises deionizing an aqueous solution of a soluble salt of Sn^{+4} with an anion exchange resin in the hydroxyl form until the cation-to-anion ratio is between about 0.5:1 and 5:1 and maintaining the pH below about 1.5.

6. A method for making a positively charged stannic oxide organosol which comprises.

a. deionizing an aqueous solution of a soluble of Sn^{+4} with an anion exchange resin in the hydroxyl form until the cation to anion ratio is between about 0.5:1 and 5:1 to provide an anion-stabilized aquasol, while maintaining the pH below about 1.5,

b. mixing the aquasol with a polar, hydrogenbonding organic liquid which has a boiling point above that of water or which forms a lower-boiling azeotrope with water; and

c. removing the water by vacuum distillation until the water concentration in the remaining organosol is less than about 1% by weight.

3,888,789
PREPARATION OF POLYMERIZATION CATALYST SYSTEMS

Robert A. Dombro; George E. Illingworth, both of Arlington Heights, and Richard A. Fronczak, Mount Prospect, all of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed Dec. 15, 1972, Ser. No. 315,720

Int. Cl. B01j *11/84*

U.S. Cl. 252—429 B **13 Claims**

1. In the preparation of a polymerization system wherein a metal alkyl, metal alkyl halide or metal hydride of an a Group IA, IIA or IIIA metal and a Lewis Base modifier selected from the group consisting of hydrocarbyl phosphines, hydrocarbyl phosphine oxides, hydrocarbyl amines, hydrocarbyl amine oxides, hydrocarbyl arsines, hydrocarbyl arsine oxides, hydrocarbyl thioethers, hydrocarbyl oxyethers and hydrocarbyl sulfoxides are added to a halide of a Group IVB, VB or VIB metal supported on an oxide of a metal of Group IIA, IIB, IIIA or IVA while maintaining the compounds in an inert atmosphere, the improvement of haliding said Group IIA, IIB, IIIA or IVA metal oxide either before or after admixture of said metal oxide with said Group IVB, VB or VIB halide by contact at a temperature of from about 20°C. to about 400°C. with a halogenating agent in an amount sufficient to insure that the halide to Group IVB, VB or VIB metal atomic ratio is greater than 10:1, said halogenating agent having the formula:

$$X_2 \text{ or } RX_n$$

in which R is a hydrogen, SO, SO_2 or hydrocarbyl radical, X is a halogen and *n* is an integer of from 1 to 10.

3,888,790
PROCESS FOR PREPARING A CATALYTICALLY ACTIVE CERAMIC COATINGS

Dong Myung Chay, Wilmington, Del., assignor to E. I. du Pont de Nemours & Company, Wilmington, Del.

Division of Ser. No. 201,894, Nov. 24, 1971, Pat. No. 3,791,995. This application Sept. 20, 1973, Ser. No. 399,328

Int. Cl. B32b *15/18;* B44d *1/34*

U.S. Cl. 252—432 4 Claims

1. A process for preparing a catalytic porcelain coating on an article, said process comprising the following sequential steps:

a. blending 70–85 parts by weight of a porous, catalytic, fired composition having a Moh's hardness of about 3–6 and a surface area of 0.2–6 $m^2/g.$, in powder form,

said composition consisting essentially of 40–80 weight percent of in-situ formed braunite; 10–50 weight percent of an alkali-free amorphous binder phase composed of a borosilicate glass made in situ from boron oxide, silicon oxide, and at least one of magnesium oxide, calcium oxide, and aluminum oxide with each other, said boron and silicon oxides being present in a weight ratio of SiO_2:B_2O_3 from about 1:1 to about 15:1; and 0–20 weight percent of a refractory crystalline phase composed of at least one of magnesium oxide, calcium oxide, strontium oxide, silicon oxide, aluminum oxide, titanium oxide, zirconium oxide, chromium oxide, iron oxide, cobalt oxide, nickel oxide, zinc oxide, and their reaction products with each other

with 15–30 parts by weight of a porcelain enamel composition having a firing range of 1350°–1500°F. and sufficient water to form a slip with a specific gravity of 1.58–1.62, the total weight being 100 parts of solids;

b. applying the slip to the article to give one or more finished coatings about 3–5 mils thick;

c. drying the coating to a bisque at a temperature below about 400°F.;

d. heating the coating at 1400°–1550°F. for 3–5 minutes; and

e. cooling to room temperature.

3,888,791
CATALYSTS FOR THE NON-SELECTIVE OXYCHLORINATION OF HYDROCARBONS

Jean Claude Daumas, Orsay, France, assignor to Rhone-Progil, Courbevoir, France

Filed Oct. 29, 1973, Ser. No. 410,967

Claims priority, application France, Oct. 31, 1972, 72.38553

Int. Cl. B01j *11/40, 11/32*

U.S. Cl. 252—455 R 11 Claims

1. Catalysts for the non-selective oxychlorination of hydrocarbons to produce superchlorinated hydrocarbons at temperatures of at most equal to 380°C, said catalysts being formed primarily of silica originating from silica hydrogel and containing 5 to 30 percent by weight of a magnesium compound expressed as magnesia, up to 4 percent by weight of titanium in the form of a compound of titanium, 2 to 10 percent by weight of copper in the form of a compound of copper, and 0.5 to 3 percent by weight of a compound of a metal selected from the group consisting of an alkali metal and an alkaline earth metal.

3. Catalysts as claimed in claim 1 in which the catalyst includes alumina and rare earth metals.

3,888,792
CATALYST OF COBALT OXIDE AND A RARE EARTH METAL OXIDE AND ITS METHOD OF PREPARATION

David Owen Hughes, Boksburg, South Africa, assignor to African Explosives and Chemical Industries Limited, Johannesburg, South Africa

Continuation of Ser. No. 151,103, June 8, 1971, abandoned. This application Sept. 24, 1973, Ser. No. 400,129

Claims priority, application South Africa, June 26, 1970, 70/4407

Int. Cl. B01j *11/22*

U.S. Cl. 252—462 11 Claims

1. Method of preparing a shaped catalyst body comprising active Co_3O_4 together with at least one oxide of an element selected from the group consisting of scandium, yttrium, lanthanum, cerium, praseodymium, neodymium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium and lutetium, which comprises co-precipitating from solution as carbonates or basic carbonates cobalt and at least one of the elements of the oxides, washing and drying the precipitate and heating the dried precipitate within the temperature range of from 250° to 450° for a period of time sufficient to convert the carbonates substantially to their respective oxides, comminuting the mixture of oxides, shaping the mixture into bodies and heating the shaped bodies within the temperature range of from 600° to 850° for a period of time sufficient to give shaped catalyst bodies suitable for use in industrial processes, the co-precipitation being carried out by mixing an aqueous solution of a salt of cobalt and a salt of at least one of said elements and a compound selected from the group consisting of alkali metal carbonate, alkali metal bicarbonate, ammonium carbonate, ammonium carbamate or ammonium bicarbonate.

3,888,793
RARE EARTH CHRYSOTILE CATALYSTS

William F. Arey, Jr., and Willard H. Sawyer, both of Baton Rouge, La., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Jan. 17, 1973, Ser. No. 324,553

Int. Cl. B01j *11/40, 11/06, 11/32*

U.S. Cl. 252—454 10 Claims

1. A synthetic chrysotile of the general formula:

$$\left[(1-x-y)\,M^{(a)} + x\bar{M}^{(b)} + y\,RE^{(c)}\right]_n (OH)_4Si_2O_5 \cdot wH_2O$$

where M and M are selected from monovalent and multivalent metal cations, of Groups IA, IB, IIA, IIB, IIIA, IIIB, IVB, VB, VIB, VIIB and VIII of the Periodic Table of Elements, having an effective ionic radius ranging from about 0.5 to about 1.0 A, RE is a metal selected from the group of rare earth metals, x is a number which expresses the atomic fraction of the metal M and ranges from about 0 to 0.30, y is the atomic fraction of RE and ranges from about 0.02 to about 0.20, a is the valence of M and is an integer ranging from 1 to 7, b is the valence of M and is an integer ranging from 1 to 7, c is the valence of RE and is an integer ranging from 1 to 4, n is a number equal to the value defined by the ratio $6/[a(1-x-y)+bx+cy]$, and w is a number ranging from 0 to 4.

3,888,794

SPENT NUCLEAR FUEL SHIPPING CASKS

Alvin H. Kasberg, Murrysville, Pa., assignor to Atlantic Richfield Company, Philadelphia, Pa.

Division of Ser. No. 160,498, July 7, 1971, Pat. No. 3,781,189. This application Oct. 3, 1973, Ser. No. 402,931

Int. Cl. G21f *1/08*

U.S. Cl. 252—478 3 Claims

1. A shield for neutron and gamma radiation comprising a UH_3-ductile cermet, said ductile metal being selected from the group consisting of aluminum, copper, lead, and mixtures thereof.

3,888,795

UH_3 CERMET

Alvin H. Kasberg, Murrysville, Pa., assignor to Atlantic Richfield Company, Philadelphia, Pa.

Division of Ser. No. 160,498, July 7, 1971, Pat. No. 3,781,189. This application Oct. 3, 1973, Ser. No. 402,934

Int. Cl. C04b *35/50*

U.S. Cl. 252—478 5 Claims

1. A cermet composition comprising a compacted blend of UH_3 powder and powder of a metal from the group consisting of copper, aluminum, lead and mixtures thereof useful for shielding gamma and neutron radiation.

3,888,796

SEMICONDUCTIVE GLAZE COMPOSITIONS

Olaf Nigol, 272 Markland Dr., Etobicoke, Ontario, Canada

Filed Oct. 27, 1972, Ser. No. 301,340

Int. Cl. H01b *1/08*

U.S. Cl. 252—518 12 Claims

1. A semiconductive glaze composition especially adapted for use in the production of semiconductive glaze coatings on ceramic insulators, comprising a base glaze in admixture with tin oxide (SnO_2), antimony trioxide (Sb_2O_3) and zinc oxide (ZnO), the base glaze consisting essentially of silica, alumina and fluxes and being adapted to be fired at a temperature in the range 2200°F. to 2400°F., the tin oxide and antimony trioxide being present in an amount from 3 to 12.5% by weight of the total solids in the composition, and the zinc oxide being present in an amount from 0.5 to 3% by weight of the total solids in the composition.

7. A semiconducting glaze composition comprising a base glaze in admixture with zinc oxide (ZnO) and a pre-calcined mixture of tin oxide (SnO_2) and antimony trioxide (Sb_2O_3), the base glaze consisting essentially of silica, alumina and fluxes and being adapted to be fired at a temperature in the range 2200°F. to 2400°F., the pre-calcined mixture being present in an amount from 3 to 12.5% by weight of the total solids in the composition, and the zinc oxide being present in an amount from 0.5 to 3% by weight of the total solids in the composition.

3,888,797

DETERGENT COMPOSITION

Hideo Marumo, Tokyo, Japan, assignor to Carapus Company, Limited, Tokyo, Japan

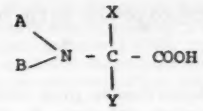
Division of Ser. No. 250,653, May 5, 1972. This application May 7, 1973, Ser. No. 357,579

Claims priority, application Japan, May 10, 1971, 46-30391; Jan. 26, 1972, 47-9019

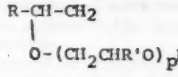
Int. Cl. C11d *3/066;* C07c *101/04, 101/24*

U.S. Cl. 252—527 4 Claims

1. A detergent composition consisting essentially of at least one surface active agent as the active component of the formula:



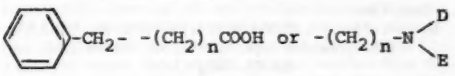
wherein either A or B is hydrogen and A and B are independently



$-(CH_2CHR'O)_qH$ or $-COCH_3$

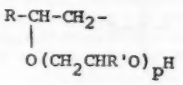
wherein R is an alkyl radical of 6 to 28 carbon atoms, R' is hydrogen or methyl, and p and q are independently integers from 0 to 50;

X is hydrogen or an alkyl radical of 6 to 28 carbon atoms; Y is hydrogen, methyl, $-CH_2CH(CH_3)CH_3$,



where n is an integer from 1 to 5, and

D and E are independently A and B; provided that when X is hydrogen, at least one of A, B, D and E is



and salts thereof.

3,888,798

LIQUID DETERGENT COMPOSITION

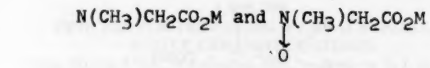
Kenneth R. Hansen, Staten Island, N.Y., assignor to Colgate-Palmolive Company, New York, N.Y.

Division of Ser. No. 90,152, Nov. 16, 1970, Pat. No. 3,723,357. This application July 12, 1972, Ser. No. 271,194

Int. Cl. C11d *3/26, 1/18*

U.S. Cl. 252—545 6 Claims

1. A liquid detergent composition having enhanced foam stability and being free from inorganic salts in an amount which adversely affects the foaming power or effect which consists essentially of (I) 5% to 35% by weight of a water-soluble foaming detergent selected from the group consisting of N-alkyl amino carboxylates having the formula $R—N(H)C_2H_4COOM$, N-alkyl imino dicarboxylates having the formula $RN(C_2H_4COOM)_2$, alkyl sulfates having the formula $R(OC_2H_4)_mOSO_3M$, N-alkyl sulfobetaines having the formula $R—N(R_1)(R_2)(CH_2)_nSO_3$, C alkyl imidazolines and alkyl betaine detergents having the formula $Z(N)-R_1R_2CH_2CO_2$ where R is an alkyl group of 10 to 16 carbon atoms, m is 0 to 5, R_1 and R_2 are C_1–C_3 alkyl or C_1–C_3 hydroxyalkyl, n is 1–3, Z is selected from the group consisting of R, $RC(O)NC_2H_4$ or $RC(O)NC_3H_6$, and M is selected from a group consisting of sodium, potassium, ammonium, and mono, di, and triethanolammonium; (II) 2% to 27% by weight of a water-soluble drainage-time extender having the formula $R—CH(OH)CH_2—Y$ wherein R is an alkyl group having from 8 to 16 carbons and Y is selected from the group consisting of



wherein M is selected from the group consisting of sodium, potassium, ammonium, and mono, di, and triethanolammonium, the sum of (I) and (II) being 10 percent to 40 percent by weight of the composition; the ratio of said detergent to drainage-time extender being in the range of from about 9:1 to 1:9 and sufficient to improve the stability; and (III) an aqueous vehicle selected from the group consisting of water and a mixture of water and a C_2–C_3 monohydric or polyhydric alcohol.

3,888,799

FLUOROPHOSPHAZENE POLYMERS CURABLE AT ROOM TEMPERATURE

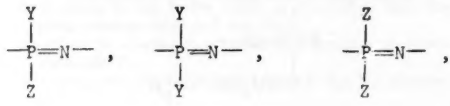
Selwyn H. Rose, Beachwood, and Kennard A. Reynard, Mentor, both of Ohio, assignors to Horizons Incorporated, Cleveland, Ohio

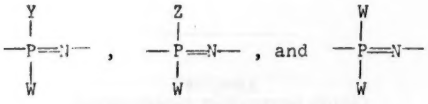
Division of Ser. No. 33,871, May 1, 1970, Pat. No. 3,702,833. This application Sept. 7, 1972, Ser. No. 287,205

Int. Cl. C08g *33/16*

U.S. Cl. 260—2 P **3 Claims**

1. Terpolymers having randomly distributed repeating units represented by the formulae:





where Y represents a monovalent radical selected from the group consisting of $F(CF_2)_n(CH_2)O$— and $H(CF_2)_n(CH_2)O$— and n is an integer from 1 to 4 and where Z represents a monovalent radical selected from the group consisting of $F(CF_2)_m(CH_2)O$— and $H(CF_2)_m(CH_2)O$— and m is an integer from $n + 2$ to $n + 5$ and the Y:Z ratio is between 1:3 and 3:1 and where W represents a group capable of further chemical reaction at moderate temperatures and selected from the group consisting of Cl and OH, and mixtures thereof; and the (Y + Z):W ratio is greater than 5:1.

3,888,800

PREPARATION OF PHOSPHAZENE POLYMERS

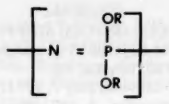
Harry Rex Allcock, State College, Pa., assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Oct. 13, 1971, Ser. No. 188,440

Int. Cl. C08f *13/00;* **C08g** *25/00*

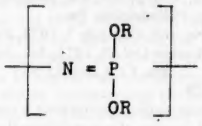
U.S. Cl. 260—2 P **1 Claim**

1. A process for preparing polyphosphazenes consisting of a skeletal chain composed of recurrring units represented by the general formula:



wherein each of OR and OR′ represents a monovalent radical selected from the group consisting of $—OCH_2(CF_2)_aCF_2F$ and $—OCH_2(CF_2)_bH$ and wherein R and R′ are different from each other, and wherein a and b are small integers between 0 and 9, which process comprises:

1. preparing homopolymers consisting of a skeletal chain composed of recurring units represented by the general formula:



in which R has the meaning given above; and

2. effecting replacement of some of the OR radicals in said homopolymer by radicals of the OR′ type by reacting said homopolymer with an alkoxide containing said OR′ radical, the radicals OR and OR′ being as defined above and being different from each other, whereby the resulting polyphosphazene possesses a desired distribution of OR and OR′ radicals attached to the P atoms along the —P=N— backbone.

3,888,801

GAS-EXPANDING POLYMERS USING HYDRAZODICARBOXYLATES

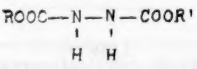
Byron A. Hunter, Woodbridge, and Franklin H. Barrows, Beacon Falls, both of Conn., assignors to Uniroyal, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 354,818, April 26, 1973, abandoned. This application Apr. 1, 1974, Ser. No. 457,036

Int. Cl. C08j *1/20*

U.S. Cl. 260—2.5 R **22 Claims**

1. A composition comprising a gas-expandable polymeric material and a compound having a formula:



wherein at least one of R and R′ is selected from the group consisting of secondary and tertiary alkyl groups having from 3 to 5 carbon atoms and the other of R and R′ is selected from the group consisting of straight-chain and branched-chain alkyl groups having from 1 to 8 carbon atoms, cycloalkyl radicals having from 5 to 8 carbon atoms, aryl radicals having from 6 to 10 carbon atoms, and alkaryl and aralkyl radicals having from 7 to 10 carbon atoms.

3,888,802
OXALYLBIS(SULFONYL HYDRAZIDES), USED AS BLOWING AGENTS FOR GAS-EXPANDABLE POLYMERIC MATERIAL

Byron A. Hunter, Woodbridge, Conn., assignor to Uniroyal, Inc., New York, N.Y.

Continuation of Ser. No. 354,819, April 26, 1973, abandoned. This application July 19, 1974, Ser. No. 489,879

Int. Cl. C08j *1/20, 1/22*

U.S. Cl. 260—2.5 R **7 Claims**

1. A composition comprising a gas-expandable polymeric material and a member selected from the group consisting of oxalylbis(sulfonyl hydrazides) and an oligomer made by reacting oxalyldihydrazide with at least one bis(sulfonyl halide).

3,888,803
HIGH TEMPERATURE POLYURETHANE FOAMS

Herman P. Doerge, Oakmont; Charles G. Slater, New Kensington, and Jerome A. Seiner, Pittsburgh, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 311,042, Nov. 30, 1972, abandoned. This application Jan. 4, 1974, Ser. No. 430,460

Int. Cl. C08g *22/16; 22/44*

U.S. Cl. 260—2.5 AQ **9 Claims**

1. A cellular rigid polyurethane resin displaying improved thermal stability, prepared from a mixture comprising:

A. an aminic polyol, said aminic polyol containing two or more hydroxyl groups, at least one amine group, and an average of no more than one ether group per molecule, said aminic polyol being the adduct of (1) a member selected from the group consisting of ammonia, diethylene triamine, ethylene diamine, mono-, di- or tri- alkanolamines and (2) an alkylene oxide or mixture of alkylene oxides;

B. an organic polyisocyanate; and

C. a cellulating system comprising a mixture of water and a fluorohalocarbon wherein the weight ratio of water to fluorohalocarbon is between about 1:1 and about 1:20.

3,888,804
PHOTODEGRADABLE HYDROCARBON POLYMERS

Carl E. Swanholm, and Robert G. Caldwell, both of Boise, Idaho, assignors to Bio-Degradable Plastics, Inc., Phoenix, Ariz.

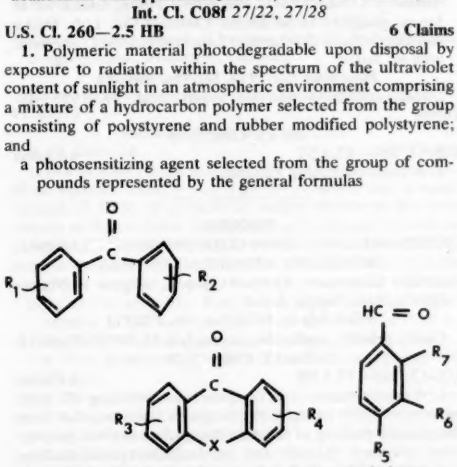
Continuation-in-part of Ser. No. 195,021, Nov. 2, 1971, abandoned. This application June 21, 1973, Ser. No. 372,046

Int. Cl. C08f *27/22, 27/28*

U.S. Cl. 260—2.5 HB **6 Claims**

1. Polymeric material photodegradable upon disposal by exposure to radiation within the spectrum of the ultraviolet content of sunlight in an atmospheric environment comprising a mixture of a hydrocarbon polymer selected from the group consisting of polystyrene and rubber modified polystyrene; and

a photosensitizing agent selected from the group of compounds represented by the general formulas



wherein R_1, R_2, R_3 and R_4 represent hydrogen, halogen, or alkyl or alkoxyl groups; R_5 and R_6 represent hydrogen, or hydroxyl or alkoxyl or alkyl groups; R_7 represents hydrogen, halogen or an alkyl or an alkoxyl group; and X represents a carbonyl group or a CHR_8 group where R_8 is hydrogen or an alkyl or alkoxyl group wherein said photosensitizing agent comprises 0.1% to 10% by weight of the polymer.

3,888,805
METHOD FOR BONDING POLYAMIDES TO RUBBER, ADHESIVE FOR THE SAME, AND ADHESIVE COATED POLYAMIDE REINFORCING ELEMENTS

Gerard E. Van Gils, Tallmadge, and Edward F. Kalafus, Akron, both of Ohio, assignors to The General Tire & Rubber Company, Akron, Ohio

Continuation-in-part of Ser. No. 310,524, Nov. 29, 1972, abandoned. This application July 19, 1973, Ser. No. 380,937

Int. Cl. C09j *3/12*

U.S. Cl. 260—5 **11 Claims**

1. A method for adhering a polyamide reinforcing element to a rubber compound which comprises treating said element with a composition consisting essentially of an aqueous alkaline dispersion of 100 parts by weight of a rubbery vinyl pyridine copolymer, from about 2 to 28 parts by weight of trimethylol phenol, from about 0.5 to 24 parts by weight of a least one water soluble, thermoplastic and non heat hardenable resorcinol compound selected from the group consisting of resorcinol and a resorcinol-formaldehyde novolak, from about 0 to 3 parts by weight of an alkaline material selected from the group consisting of NH_3 and NaOH, and from about 170 to 1100 parts by weight of water, heating said treated element at a temperature and for a period of time sufficient to remove essentially all of the water from said composition and to leave on said element a heat cured adhesive in an amount of from about 0.5 to 7% by weight (dry) based on the weight of said reinforcing element, combining said dried and heat cured adhesive containing reinforcing element with an unvulcanized rubber compound, and vulcanizing the same.

3,888,806
POLYURETHANE COMPOSITE STRUCTURES

Earle L. Kropscoti, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Nov. 16, 1972, Ser. No. 307,150

Int. Cl. 264 *45, 122;* **C03c** *25/00*

U.S. Cl. 260—33.8 UB **3 Claims**

1. A polyurethane composite comprising

1. a fibrous matt material conformed to a desired configuration which prior to said conformation has disposed thereon granular plastic scrap material and

2. a rapid-setting polyurethane composition disposed about and throughout component (1);

wherein the rapid-setting polyurethane is a composition comprising:

A. a polyol selected from the group consisting of polyether polyols having from about 3 to about 8 hydroxyl groups and a hydroxyl equivalent weight of from about 75 to about 230, and dihydroxyl-containing compounds having an OH equivalent weight of less than about 250;

B. an organic polyisocyanate with the proviso that when component (A) is a dihydroxyl-containing compound, the polyisocyanate has an NCO functionality of at least 2.5;

C. a liquid modifier compound having a boiling point above about 150°C with the proviso that when the liquid modifier compound is a halogenated aliphatic compound containing substituent hydroxyl groups then the boiling point may be less than 150°C;

D. a non-amine-containing catalyst for urethane formation; wherein components (A) and (B) are present in quantities so as to provide an NCO:OH ratio of from about 0.8:1 to about 2:1, component (C) is present in quantities of from about 20 to about 50 percent by weight of the sum of components (A), (B) and (C); and component (D) is

present in quantities of from about 0.2 to about 10 percent by weight of the sum of the weight of components (A), (B) and (C); with the proviso that when component (C) is a halogenated aliphatic compound, it is employed in a range of from about 0.2 to about 50 percent by weight of the sum of the weights of A, B and C, that when the halogenated aliphatic compound also contains hydroxyl groups and has an OH equivalent weight of less than about 500 it is employed in quantities of from about 0.2 to about 5 percent by weight based upon the sum of the weights of (A), (B) and (C), and that when component (C) is a non-ester-containing aromatic compound or a halogenated aliphatic compound, the non-amine containing catalysts, component (D), is employed in quantities of from about 0.01 to about 10 percent by weight of the combined weights of components (A), (B) and (C), and when component (A) is an amine initiated polyol, component (D) may be omitted.

3,888,807

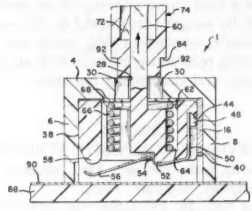
SLIDE SWITCH WITH RETRACTION FEATURES

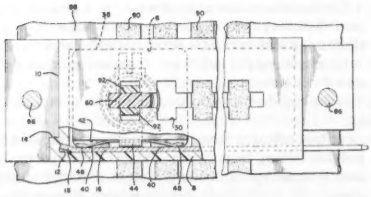
Joseph Larue Lockard, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 366,926, June 4, 1973, abandoned. This application Sept. 5, 1974, Ser. No. 503,406

Int. Cl. H01h *15/00, 3/50*

U.S. Cl. 200—16 R **11 Claims**





1. An switch, comprising:

a dielectric base member having an elongated slot and a series of notches spaced along said slot,

an elongated strip contact on said base member,

a carriage protruding through said slot,

an electrical terminal mounted on said carriage and in slidable engagement on said strip contact,

said base member having an open side,

a resilient spring in compression between said base member and said carriage and resiliently urging said carriage and said terminal to project toward said open side of said base and to establish an electrical terminal projecting toward said open side of said base,

said carriage being displaceable along said slot,

said carriage including a knob portion selectively positionable in registration within at least a selected one of said notches,

said spring resiliently urging said knob portion into detenting engagement within said selected notch,

said knob portion and said carriage and said terminal being displaceable to compress resiliently said spring and also to disengage said knob portion from said selected notch and to retract said terminal from said open side of said base member,

said carriage being displaceable along said slot with said terminal being retracted from said open side of said base member and with said knob portion being disengaged from said series of notches.

3,888,808

TALL OIL EPOXY ESTER EXTERIOR COATING FOR LAP-SEAM BEVERAGE CANS

John D. Downs, Bradley, and Andrew Leo Massa, Kankakee, both of Ill., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 293,635, Sept. 29, 1972, abandoned. This application Nov. 30, 1973, Ser. No. 420,401

Int. Cl. C08g *30/04*

U.S. Cl. 260—18 EP **9 Claims**

1. A thermosetting resin that consists essentially of a polyglycidyl ether of a bisphenol, having a molecular weight of between about 170 and about 200 and an Epoxy Value between about 0.50 and about 0.60, upgraded in molecular weight with a stoichiometric amount of additional bisphenol by reaction at temperatures of between about 215°C and about 225°C for between about 20 minutes and about 30 minutes, forming an upgraded epoxy having a WPE of between about 1600 and about 2000; and said upgraded epoxy being esterified with an unsaturated fatty acid mixture, obtained from tall oil, consisting essentially of, by weight 25 to 55 percent oleic acid, 35 to 65 percent linoleic acid, with the balance essentially being conjugated linoleic acid; esterification being carried out using a weight ratio of upgraded epoxy: fatty acid mixture of between about 65:35 and about 70:30 at temperatures between about 225°C and about 250°C for between about 6 hours and about 8 hours.

3,888,809

PAINT CONTAINING PULLULAN

Seizo Nakashio, Nishinomiya; Noriyuki Sekine, Osaka; Nobuhiro Toyota, Osaka, and Fumio Fujita, Osaka, all of Japan, assignors to Sumitomo Chemical Co., Ltd., Osaka and Hayashibara Biochemical Laboratories, Inc., Okayama, both of, Japan

Filed Sept. 24, 1974, Ser. No. 508,844

Claims priority, application Japan, Sept. 29, 1973, 48-10994

Int. Cl. C08d *9/06*

U.S. Cl. 260—17.4 ST **6 Claims**

1. A paint containing pullulan.

3,888,810

THERMOPLASTIC RESIN COMPOSITION INCLUDING WOOD AND FIBROUS MATERIALS

Toshihiko Shinomura, Kawasaki, Japan, assignor to Nippon Oil Co., Ltd., Tokyo, Japan

Filed July 9, 1973, Ser. No. 377,711

Claims priority, application Japan, July 11, 1972, 47-69222

Int. Cl. C08g *45/18*

U.S. Cl. 260—17.4 BB **3 Claims**

1. A thermoplastic resin composition comprising 100 parts by weight of one or more thermoplastic resins selected from the group consisting of polyethylene, polypropylene, polystyrene, polyvinyl chloride and acrylonitrile-styrenebutadiene resin; 10 – 500 parts by dry weight of one or more wood materials selected from the group consisting of saw-dust,

bark-dust and paper-mill wastes; and 2 – 100 parts by weight of fibrous materials selected from the group consisting of polyester fiber, polyamide fiber, polyacrylic fiber, glass fiber, silica-alumina fiber and rayon.

3,888,811

WATER-MOISTENABLE HOT-MELT APPLICABLE ADHESIVE COMPOSITION

Jilius Sirota, Plainfield; Robert S. Forsyth, Basking Ridge, and David Fergesen, Neshanic Station, all of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Sept. 26, 1973, Ser. No. 400,926
Int. Cl. C08f *19/14, 21/04*
U.S. Cl. 260—23 R **11 Claims**

1. A water-moistenable hot-melt applicable adhesive composition

A. characterized by the absence of blocking at 75 percent relative humidity under a 0.4 p.s.i.g. load at 22℃ for 24 hours; and

B. consisting essentially of a blend of

1. at least one water-sensitive vinyl pyrrolidone/vinyl acetate copolymer,
2. at least one water-soluble solid polyethylene glycol based wax having an average molecular weight of at least 4,000, and
3. at least one water-insoluble solid wax.

3,888,812

PROCESS FOR THE MANUFACTURE OF AQUEOUS EXPOXIDE RESIN EMULSIONS

Wolfram Plettner, Glinde, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt, Germany

Filed July 18, 1973, Ser. No. 380,390
Claims priority, application Switzerland, July 25, 1972, 11104/72
Int. Cl. C08c *9/18;* **C08d** *3/40*
U.S. Cl. 260—24 **10 Claims**

1. In a process for the manufacture of an aqueous emulsion of an epoxide resin, which aqueous emulsion has a water content of 50 to 70 percent by weight relative to the total amount of the emulsion, by emulsifying liquid epoxide resin or an epoxide resin which is liquid between 20° and 80℃ using water in the presence of an emulsifier, the improvement which comprises

using as the emulsifier from 0.5 to 15 percent by weight, relative to the total weight of the epoxide resin, of an emulsifier mixture consisting of

a. 30 to 50 percent by weight of an abietic acid polyglycol ester,

b. 20 to 40 percent by weight of an ether selected from the group consisting of a polyglycol ether of a fatty alcohol, a polyglycol ether of a p-alkylphenol, and mixtures thereof, and

c. 10 to 30 percent by weight of long chain aliphatic alcohol of 8 to 18 carbon atoms,

wherein the sum of the emulsifier components (a), (b) and (c) adds up to 100 percent by weight.

3,888,813

TIRE CORD DIP FOR POLYESTER FIBERS

Roy H. Moult, and Richard T. Hood, both of Murrysville, Pa., assignors to Koppers Company, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 373,274, June 21, 1973, abandoned, which is a continuation-in-part of Ser. No. 232,270, March 6, 1972, abandoned, which is a continuation-in-part of Ser. No. 105,552, Jan. 11, 1971, abandoned, which is a continuation-in-part of Ser. No. 815,491, April 11, 1969, abandoned. This application May 28, 1974, Ser. No. 473,439
Int. Cl. C08g *51/24*
U.S. Cl. 260—29.3 **6 Claims**

1. A water insoluble phenol formaldehyde resorcinol resin comprising a phenylene portion which is from about 55 to about 75 mole percent phenol and from about 25 to about 45 mole percent resorcinol and a formaldehyde portion which is from about 60 to about 70 mole percent formaldehyde based on the phenylene portion and wherein the mole ratio of formaldehyde to phenol is from about 0.75:1 to 1.1:1 and wherein the resin is prepared by:

a. reacting the phenol and the formaldehyde at a temperture between about 60℃ and the boiling point of the phenol formaldehyde reaction mixture, under mildly alkaline conditions at an initial pH of about 8 to 10 until the phenol-formaldehyde reaction mixture has a molecular weight of 1,000–1,600 and a dilutability of from about 1:1.2 to about 1:0.8 at the pH of the phenol-formaldehyde reaction mixture;

b. adding the resorcinol and reacting the phenol formaldehyde reaction mixture with the resorcinol to form a phenol formaldehyde resorcinol resin;

c. distilling the phenol formaldehyde resorcinol resin to drive the reaction of step (b) to completion and to remove substantially all the water and unreacted phenol;

d. washing the distilled phenol formaldehyde resorcinol resin with a dilute aqueous acid solution to remove the unreacted resorcinol and low molecular weight oligomers.

3. In a polyester tire cord adhesive dip comprising a rubber latex and a phenolic resin, the improvement comprises using as the said resin a water insoluble phenol formaldeyde resorcinol resin comprising a phenylene portion which is from about 55 to 75 mole percent phenol and from about 25 to about 45 percent resorcinol and a formaldehyde portion which is from about 60 to 70 mole percent formaldehyde based on the phenylene portion and wherein the mole ratio of formaldehyde to phenol is from about 0.75:1 to 1.1:1 and wherein the resin is prepared by:

a. reacting the phenol and the formaldehyde at a temperature between about 60℃ and the boiling point of the phenol formaldehyde reaction mixture, under mildly alkaline conditions at an initial pH of about 8 to 10 until the phenol formaldehyde reaction mixture has a molecular weight of 1,000–1,600 and a dilutability of from about 1:1.2 to about 1:0.8 at the pH of the phenol formaldehyde reaction mixture;

b. adding the resorcinol and reacting the phenol formaldehyde reaction mixture with the resorcinol to form a phenol formaldehyde resorcinol resin;

c. distilling the phenol formaldehyde resorcinol resin to drive the reaction of step (b) to completion and to remove substantially all the water and unreacted phenol;

d. washing the distilled phenol formaldehyde resorcinol resin with a dilute aqueous acid solution to remove the unreacted resorcinol and low molecular weight oligomers.

3,888,814
RUBBER COMPOSITIONS WITH IMPROVED PERFORMANCE AT SUB-ZERO TEMPERATURES

Paul Chalex, and Selwyn R. Mather, both of Elmhurst, Ill., assignors to The Richardson Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 102,506, Dec. 29, 1970, abandoned, which is a continuation-in-part of Ser. No. 682,518, Nov. 13, 1967, abandoned. This application Aug. 24, 1972, Ser. No. 283,599

Int. Cl. C08c *11/18, 11/22;* **H01m** *1/02*

U.S. Cl. 260—33.6 AQ **7 Claims**

1. A molded article having improved impact peformance at sub-zero temperatures, the article being formed by curing in a mold a rubber composition characterized by an elastomeric butadiene polymer having a reduced styrene content of less than about 10 weight percent, the composition containing about 8–20 weight percent of the polymer, and based on the weight of the polymer about 8–25 weight percent sulfur and about 40–70 weight percent of a saturated oil, and the remainder primarily an inert filler of semi-anthracite coal wherein said oil is characterized by maximums of about 8 percent nitrogen base components and 17 percent first acidaffins and a minimum of about 75 percent of saturates, second acidaffins, or mixtures thereof said composition containing an activator comprising lime.

3,888,815
SELF-BONDING TWO-PACKAGE ROOM TEMPERATURE VULCANIZABLE SILICONE RUBBER COMPOSITIONS

Stanley J. Bessmer, Cohoes, and Warren R. Lampe, Ballston Lake, both of N.Y., assignors to General Electric Company, Waterford, N.Y.

Continuation of Ser. No. 389,733, Aug. 20, 1973, abandoned, which is a continuation of Ser. No. 180,068, Sept. 13, 1971, abandoned. This application June 12, 1974, Ser. No. 478,824

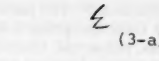
Int. Cl. C08g *51/04*

U.S. Cl. 260—37 SB **38 Claims**

1. A self-bonding room temperature vulcanizable silicone rubber composition comprising (a) a linear, fluid organopolysiloxane containing terminal silicon-bonded hydroxy groups and having a viscosity of 500 to 10,000,000 centipoise when measured at 25℃, the organic groups of the aforesaid organopolysiloxane representing monovalent hydrocarbon radicals; (b) 5 to 300 percent by weight of a filler; (c) from 0.1 – 15 percent by weight of an alkyl silicate selected from the class consisting of (1) a monomeric organosilicate corresponding to the general formula,

$$(R^{40}O)_3Si—R^{41},$$

where R^{40} is a radical selected from the class consisting of monovalent hydrocarbon radicals and halogenated monovalent hydrocarbon radicals and R^{41} is selected from the class consisting of alkyl, haloalkyl, aryl, haloaryl, alkenyl, cycloalkyl, cycloalkenyl, cyanoalkyl, alkoxy and acyloxy radicals, and (2) a liquid partial hydrolysis product of the aforementioned organosilicate monomeric compounds; (d) from 0.1 to 5 percent by weight of the organopolysiloxane of a catalyst which is metallic salt of an organic monocarboxylic or dicarboxylic acid in which the metal ion is selected from the class consisting of lead, tin, zirconium, antimony, iron, cadmium, barium, calcium, titanium, bismuth and manganese, and e from 0.1 to 10 percent by weight of a nitrogen-functional silane of the formula,



(3-a)

where R is selected from the class consisting of monovalent hydrocarbon radicals and halogenated monovalent hydrocarbon radicals, ϵ is a hydrolyzable group selected from the class consisting of alkoxy, phenoxy, amino, and dialkylamino and θ is a nitrogen-functional radical which is a saturated, unsaturated or aromatic hydrocarbon residue which in addition to nitrogen-functionality may be functionalized by a radical selected from the class consisting of amino, cyano, thiom oxo, and ester, and multiples and combinations thereof and a is a whole number that varies from 0 to 2.

3,888,816
PROCESS FOR PRODUCING BOUND AGGREGATE BUILDING MATERIAL

Lloyd H. Brown, Crystal Lake, and Daniel S. P. Eftax, Barrington, both of Ill., assignors to The Quaker Oats Company, Chicago, Ill.

Continuation-in-part of Ser. No. 112,487, Feb. 3, 1971, abandoned. This application June 18, 1973, Ser. No. 371,067

Int. Cl. C08g *51/04*

U.S. Cl. 260—39 R **16 Claims**

1. A process for producing a bound aggregate building material composition consisting essentially of the steps of:

a. forming a first mixture comprising a monomeric binder mixture of from 99.5 percent to 99.9875 percent by weight monomeric furfuryl alcohol, and from 0.5 percent to 0.0125 percent by weight of a silane coupling agent of the general formula:

$$X—R'—Si—(OR'')_3$$

wherein R′ is a short chain alkylene containing between about 3 and 6 carbon atoms; R″ is a radical selected from the group consisting of aryl, alkyl, substituted aryl, and heteroalkyl; and X is a reactive member selected from the group consisting of amino, mercapto, epoxy, and glycidoxy;

b. forming a second mixture comprising a mixture of aggregate and acidic catlyst, said aggregate and said acidic catlyst being mixed in a proportion such that when from 2 percent to 20 percent by weight of said first mixture is mixed with from 98 percent to 80 percent by weight of the aggregate-acidic catalyst mixture, the acidic catalyst is present in an amount of from 5 percent to 50 percent by weight of the monomeric binder; and

c. admixing said first mixture and said second mixture in an amount such that the first mixture contributes from 2 percent to 20 percent by weight and said second mixture contributes from 98 percent to 80 percent by weight.

3,888,817
STABILIZED POLYESTER COMPOSITIONS

Paul C. Georgoudis, Dunellen, N.J., assignor to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Apr. 5, 1973, Ser. No. 348,217

Int. Cl. C08d *7/10*

U.S. Cl. 260—45.7 PH **6 Claims**

1. A saturated polyester composition stabilized against thermal degradation comprising,

a. a polyester blended with

b. 0.3 5.0 percent, by weight, of the polyester, of a combination comprising

1. 10 to 90 percent, by weight, of at least one cyclic organic carbonate having at least one cyclic organic carbonate group per molecule containing 5–6 atoms in the ring, and

2. at least one antioxidant selected from the group consisting of alkyl phosphites and arylphosphites wherein the alkyl groups contain from 2 to 18 carbon atoms.

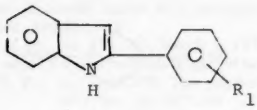
3,888,818

THERMAL STABILIZATION OF VINYL RESINS WITH DERIVATIVES OF ALPHA-PHENYLINDOLE

Claude Deblandre, La Hulpe, and Jean Guyaux, Brussels both of Belgium, assignors to Solvay & Cie, Brussels, Belgium

Filed Sept. 7, 1973, Ser. No. 395,063
Claims priority, application France, Sept. 8, 1972, 72.32076
Int. Cl. C08f *45/60*
U.S. Cl. 260—45.8 N 6 Claims

1. In a thermally stabilized vinyl resin composition comprising vinyl resin and at least one thermal stabilizer distributed therein, the improvement wherein said stabilizer comprises a compound having the formula:



in which:

R_1 is a linear or branched alkyl or cycloalkyl chain containing from 4 to 20 carbon atoms, said stabilizer being present in an amount of from about 0.05 to 1 part by weight per 100 parts by weight of vinyl resin.

3,888,819

COMPOSITIONS COMPRISING SULFAMIDE FOR INCREASING FLAME RESISTANCE OF POLYMERS

Francis E. Evans, Hamburg, N.Y., and Kenneth B. Gilleo, St. Paul, Minn., assignors to Allied Chemical Corporation, New York, N.Y.

Filed Apr. 29, 1974, Ser. No. 465,224
Int. Cl. C08g *17/56*
U.S. Cl. 260—45.8 N 10 Claims

5. A step-reaction polymer selected from the group consisting of polyesters, polyanhydrides, polyacetals, polyamides and polyurethanes containing from about 1 to about 15 weight percent of a composition comprising:

a. sulfamide; and

b. from about 40 to about 85 weight percent of a compound selected from the group consisting polyhydroxy-polycarboxy acids and their metal and ammonium salts, mercapto polycarboxylic acids and their metal and ammonium salts, polyhydroxy benzoic acids and their metal and ammonium salts, the lithium and sodium salts of monohydroxy polycarboxy acids, and the metal and ammonium salts of trithiocyanuric acid.

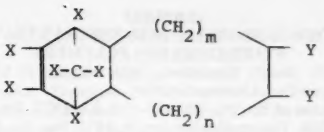
3,888,820

NOVEL FLAME RETARDANT COMPOSITIONS OF MATTER

Irving Touval, Fords, and Morris Dunkel, Paramus, both of N.J., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed Dec. 20, 1972, Ser. No. 316,942
Int. Cl. C08c *11/24*
U.S. Cl. 260—45.7 R 7 Claims

1. A novel flame retardant composition of matter comprising a polymeric material and a compound possessing the formula:



in which X is selected from the group consisting of hydrogen and halogen, at least two X's being halogen, Y is halogen, and m and n are an integer of from 1 to 2.

3,888,821

AROMATIC POLYAMIDE FIBERS CONTAINING ULTRAVIOLET LIGHT SCREENERS

George Noel Milford, Jr., Waynesboro, Va., assignor to E. I. Du Pont De Nemours & Company, Wilmington, Del.

Filed Nov. 2, 1972, Ser. No. 303,202
Int. Cl. C08f *45/58*; C08g *51/58*
U.S. Cl. 260—45.8 NT 7 Claims

1. An aromatic polyamide fiber containing an effective amount of an ultraviolet light screener in which the screener is microdispersed in the fiber in a discrete form such that any agglomerate thereof is less than 0.01 micron in diameter, and in which the screener absorbs electromagnetic radiation in the 340 to 390 millimicron wavelength region.

3,888,822

PROCESS FOR INCREASING FLAME RESISTANCE OF NYLON AND RESULTING FLAME RESISTANT NYLON COMPOSITION

Kenneth B. Gilleo, Depew; Francis E. Evans, Hamburg, and Allen W. Sogn, Williamsville, all of N.Y., assignors to Allied Chemical Corporation, New York, N.Y.

Filed Dec. 17, 1973, Ser. No. 425,488
Int. Cl. C08f *45/58*
U.S. Cl. 260—45.8 NT 41 Claims

1. A composition comprising nylon and from about 0.5 to about 25 weight percent of a compound of the formula

$$(R_1)_n—Q=(R_2)_m$$

wherein Q comprises a heterocyclic ring structure which may be substituted and contains at least one sulfur or nitrogen atom in the ring; R_1 is independently at each occurrence a monovalent radical containing no more than 55 weight percent carbon and at least one sulfur or nitrogen atom; R_2 is independently at each occurrence a divalent radical containing fewer than 10 atoms other than hydrogen and at least one sulfur or nitrogen atom; n is 0 or an integer 1 through 6 and m is 0 or an integer of 1 through 3 and the sum of $n + 2m$ is 0 or an integer of 1 through 6, with the proviso that said compound contains at least one nitrogen atom and at least one sulfur atom, contains no non-cyclic imine group, and the ratio of the number of carbon atoms in the compound to the total number of atoms having an atomic number greater than two other than carbon in the compound being 2:1 or less, said compound including no carbon chain containing over six carbon atoms and being free of phosphorous, arsenic, halogens, and hexavalent sulfur which is directly bonded to a carbon atom.

3,888,823

METHOXY CARBOXYLIC ACID ESTER ULTRAVIOLET STABILIZERS FOR POLYMERS

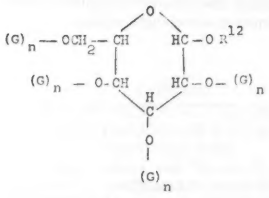
Robert G. Gough, Cincinnati, Ohio, assignor to Cincinnati Milacron Inc., Cincinnati, Ohio

Division of Ser. No. 297,446, Oct. 13, 1972, Pat. No. 3,814,729. This application Jan. 9, 1974, Ser. No. 431,913
Int. Cl. C08f *45/60*
U.S. Cl. 260—45.8 A 22 Claims

1. A composition comprising a member of the group consisting of solid monoolefin polymers and solid polyolefin polymers containing a stabilizingly effective amount of a compound having the formula

where R is alkoxyphenyl, dialkoxyphenyl or alkylene dioxyphenyl, the alkoxy groups having 1 to 8 carbon atoms, and the alkylene group having 1 to 4 carbon atoms, q is 1 to 4, Z is

(a)



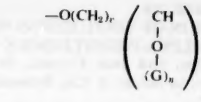
where R^{12} is lower alkyl and G is H or

R^8 is hydrocarbyl N is 0 or 1 and where at least one of the n's must be zero;

(b)

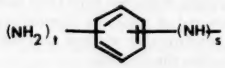
where s is 1 to 3 and t is from 0 to 2, the total of s and t being not over 3;

(c)

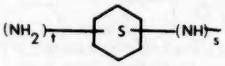


where v and w are each 1 to 4 and p is 2 to 4;

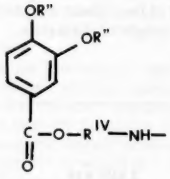
(d)



(e)

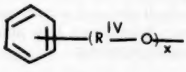


(f)

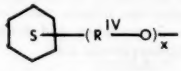


where R'' and R''' are 1 to 8 carbon atom alkyl or where R'' and R''' together with the oxygen atoms attached thereto and the adjacent carbon atoms of the benzene ring for a 5 or 6 membered heterocyclic ring and R^{IV} is 1 to 4 carbon atom alkylene;

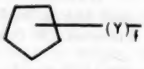
(g)



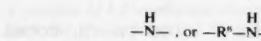
or



where x is 2 to 3;
(h) alkoxy of 1 to 18 carbon atoms;
(i) NHR^9 where R^9 is 1 to 18 carbon atom alkyl or H; or



where Y is —O—, —R^6—O— where R^6 is alkylene 1 to 3 carbon atoms,



and *f* is 2 to 4.

3,888,824
N-AROYL-N -(ALKYLHYDROXYPHENYL) ALKANOYLHYDRAZINE STABILIZERS

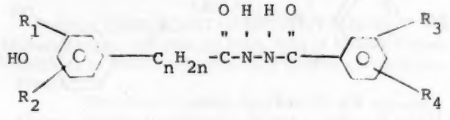
Martin Dexter, Briarcliff Manor, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 231,391, March 2, 1972, Pat. No. 3,773,830, which is a continuation-in-part of Ser. No. 28,048, April, 1970, Pat. No. 3,660,438. This application Nov. 19, 1973, Ser. No. 417,336

Int. Cl. C08f *45/60;* **C08g** *51/60*

U.S. Cl. 260—45.9 NC **5 Claims**

1. An organic composition subject to oxidative and/or thermal degration stabilized with 0.01 to 2% by weight of a compound having the formula



wherein

R_1 is an alkyl group containing from 1 to 5 carbon atoms,

R_2 is hydrogen or an alkyl group containing from 1 to 5 carbon atoms,

R_3 and R_4 are independently hydrogen, alkyl, alkoxy or halogen, where the alkyl group has up to 18 carbon atoms, and

n is an integer from 0 to 5.

3,888,825
COPPER INHIBITORS FOR POLYOLEFINS

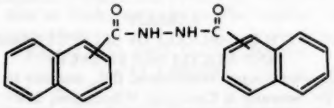
Edward Joseph Schurdak, Somerville, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Oct. 19, 1973, Ser. No. 408,213

Int. Cl. C08f *45/60*

U.S. Cl. 260—45.85 B **11 Claims**

9. Polypropylene stabilized against copper-catalyzed thermal degradation by the combination of (*a*) an amount of a hindered-phenol antioxidant sufficient to stabilize said polypropylene against thermal degradation in the absence of copper and (*b*) an amount of a compound of the formula



sufficient to reduce the effects of copper on such thermal degradation even in the presence of said hindered-phenol antioxidant.

3,888,826
PROCESS FOR PREPARING AROMATIC POLYCARBONATES

Hirosuke Yamana, Nagoya; Tadashi Kunii, Tomotaka Furusawa, Yoshihiro Sugimura, Hiroshi Nakai, all of Yokkaichi, and Yasuo Hiro, Suzuka, all of Japan, assignors to Mitsubishi Gas Chemical Co., Inc., Tokyo, Japan

Filed July 2, 1973, Ser. No. 375,492

Claims priority, application Japan, July 10, 1972, 47-68253; Oct. 28, 1972, 47-107621

Int. Cl. C08g *17/13, 35/00*

U.S. Cl. 260—47 XA **4 Claims**

1. In a process for preparing an aromatic polycarbonate by interesterifying diphenyl carbonate and bisphenol A in the presence of a catalyst for the interesterification, the improvement comprising the steps of:

1. effecting a continuous or batch polymerization of diphenyl carbonate and bisphenol A firstly at a temperature of 160°–250°C and a reduced pressure for a period of 2–5 hours, the reduced pressure being gradually decreased from 50–200 mmHg to 1–10 mmHg during said period, and lastly at a temperature of 240°–270°C and a reduced pressure of not higher than 5 mmHg for a period of 1–30 minutes to produce a polycarbonate prepolymer having a viscosity-average molecular weight of 5,000–12,000 wherein the number of the terminal hydroxyl groups is 50–80% of that of the total terminal functional groups, and then
2. feeding the thus-produced polycarbonate prepolymer continuously to a film evaporator type reactor wherein the prepolymer is subjected to further polymerization at a temperature of 230°–330°C and a reduced pressure of not higher than 1 mmHg for a residence time of 5–30 minutes to obtain a high molecular weight, aromatic polycarbonate.

3,888,827
1,2-EPOXY RESIN COMPOSITIONS CONTAINING AMINIMIDE COMPOUNDS

Kanji Matueda, Futatsubashi; Hideki Niino, Yokohama, and Yoshitomo Nakano, Yokkaichi, all of Japan, assignors to Permachem Asia Co. Ltd. and Mitsubishi Petrochemical Co. Ltd., both of Tokyo, Japan

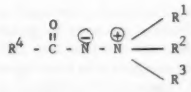
Filed Nov. 16, 1973, Ser. No. 416,667

Claims priority, application Japan, Nov. 20, 1972, 47-115704

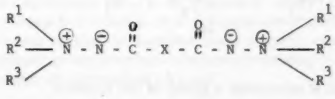
Int. Cl. C08q *30/14*

U.S. Cl. 260—47 EC **25 Claims**

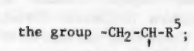
1. Epoxy resin compositions of superior hardenability which consist essentially of a 1,2-epoxy resin, a polycarboxylic acid anhydride at an equivalent rate of 0.6 to 1.2 per equivalent of the epoxy resin and an aminimide compound of the formula



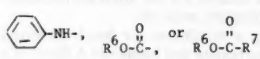
or



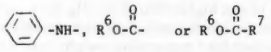
wherein R^1 is an alkyl group, a benzyl group or the group



R^2 and R^3 are the same or different, and each represents an alkyl group; R^4 is an alkyl group, an aryl group, an aralkyl group, a cycloakyl group, an alkoxy group, aryloxy group, an alkenyl group,



when R^1 is a benzyl group, and



R^5 is a hydrogen atom, an alkyl group, an aryl group, an alkoxyalkyl group, an aryloxyalkyl group, an allyloxyalkyl group, a hydroxyalkyl group, a methacryoxymethyl group or an acryloxymethyl group; R^6 is an alkyl group, an aryl group or an aralkyl group; R^7 is a residue of an aliphatic, cycloaliphatic or aromatic hydrocarbon; and X is a direct bond in an amount of 0.1 to 5 parts by weight of the epoxy resin.

3,888,828

SULFOSUCCINIC ACID SEMI-ESTERS OF OXYALKYLATED POLYNUCLEAR ALKYL-PHENOLS

Max Grossmann, Frankfurt am Main; Ruth Faber, Burgkirchen, and Heinz Uhrig, Steinbach, Aunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

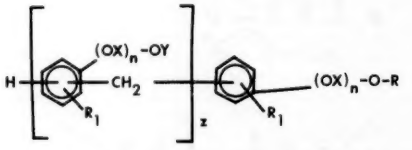
Filed June 29, 1972, Ser. No. 267,512

Claims priority, application Germany, June 30, 1971, 2132405

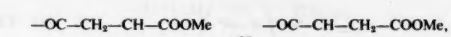
Int. Cl. C08g *5/18*

U.S. Cl. 260—49 **5 Claims**

1. Sulfosuccinic acid semi-esters of oxalkylated polynuclear alkyl-phenols of the general formula I



in which R represents a group of the formula



—(O—X) represents oxyethylene, oxypropylene and mixture thereof, R_1 represents a saturated straight chain or branched alkyl group having 6 to 14 carbon atoms, Y represents hydrogen or has the same meaning as that given for R, *n* represents a number from 2 to 25, z represents a number from 1 to 9 and Me stands for hydrogen or an alkali metal.

3,888,829

N,N'-BIS[3-HYDROXY-2-(3,4-DIHYDROXY-PHENYL)-1-PROPYL] ALIPHATIC-DIAMINES

Jean-Michel Bastian, Therwil, and Klaus Hasspacher, Riehen, both of Switzerland, assignors to Sandoz, Inc., Basel, Switzerland

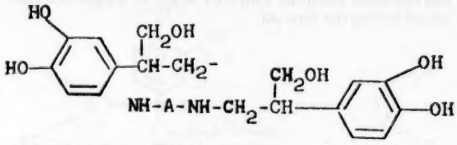
Filed June 20, 1972, Ser. No. 264,422

Claims priority, application Switzerland, June 25, 1971, 9347/71; Aug. 26, 1971, 12494/71

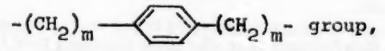
Int. Cl. C07c *91/16*

U.S. Cl. 260—570.6 **8 Claims**

1. A compound of the formula:



wherein A is a $-(CH_2)_n-$ group,
wherein *n* is an integer from 2 to 10, or a



wherein *m* is 2,
or a pharmaceutically acceptable acid addition salt thereof.

3,888,830

CURABLE COMPOSITIONS

Takahisa Ogasawara; Yoshimichi Senzaki; Hiroyuki Kato, and Hidemaro Tatemichi, all of Nagoya, Japan, assignors to Toagosei Chemical Industrial Co., Ltd., Tokyo, Japan

Filed Nov. 5, 1973, Ser. No. 412,878

Claims priority, application Japan, Nov. 10, 1972, 47-112624

Int. Cl. C08g *17/10;* **C07c** *69/54*

U.S. Cl. 260—76 **5 Claims**

1. A curable composition comprising a radical polymerization initiator and an oligoacrylate containing 4-6 acryloyl groups and at least one cyclohexene nucleus in the molecule and having a boiling point of not lower than 200°C and an acryloyl group equivalent of not more than 1000, the oligoacrylate being a reaction product prepared by interesterifying a mixture of acrylic acid, at least one member selected from the group consisting of tetrahydrophthalic acid and anhydride thereof, and at least one member selected from the group consisting of trimethylolpropane and pentaerythritol.

3,888,831

CURING WITH COMPLEXES OF SELECTED DIAMINES AND ALKALI METAL SALTS

Irving Charles Kogon, Wilmington, Del., assignor to E. I. Du Pont De Nemours & Company, Wilmington, Del.

Filed Oct. 1, 1973, Ser. No. 402,490

Int. Cl. C08g *22/00*

U.S. Cl. 260—77.5 AM **20 Claims**

1. In a process for curing an amine-curable polymer or prepolymer with a curing agent which is either

1. a complex of 4,4′-methylene dianiline and a salt selected from the group consisting of sodium chloride, sodium bromide, sodium iodide, sodium nitrite, lithium chloride, lithium bromide, lithium iodide, lithium nitrite, and sodium cyanide, or
2. a complex of racemic 2,3-di(4-aminophenyl) butane with a salt selected from the group consisting of sodium chloride, sodium bromide, sodium iodide, potassium chloride, potassium bromide, potassium iodide, rubidium chloride, rubidium bromide, rubidium iodide, cesium chloride, cesium bromide and cesium iodide; the ratio of said dianiline or said butane to said salt in the complex being 3 moles to 1 mole,

the improvement comprising employing said curing agent in conjunction with a polar or polarizable compound having no reactive hydrogen and selected from (A) compounds having dipole moments in excess of 0.4 debye in which there are no more than a total of eight CH_3—, CH_2, or tertiary carbon radicals per polar group contained in the compound, and (B) benzene and biphenyl; said polar or polarizable compound representing about 0.25–25% by weight of the total weight of complex and polar compound.

3,888,832

PROCESS FOR OBTAINING POLYAMIDES

Michael Biensan, and Philippe Potin, both of Billiere, France, assignors to Societe Aquitaine-Total Organico, Courbevoie, France

Filed Aug. 16, 1972, Ser. No. 281,152
Claims priority, application France, Aug. 25, 1971, 71.30755
Int. Cl. C08g *20/18*
U.S. Cl. 260—78 L **7 Claims**

1. In a process for preparing stabilized polyamides of high molecular weight by anionic polymerization of lactams, the improvement comprises polymerizing said lactam in an anhydrous medium with an alkali catalyst and adding to the resulting polymer at least one tertiary alcohol of the formula

wherein R_1, R_2, and R_3 are paraffin radicals, the amount of the added tertiary alcohol being from about 0.05 to about 2.00 moles per 100 moles of the starting lactam.

3,888,833

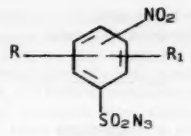
METHOD FOR BINDING ANTITHROMBOTIC OR ANTICLOTTING SUBSTANCES TO A SUSCEPTIBLE MATERIAL INVOLVING THE USE OF AN AROMATIC SULFONYL NITRENE

Daniel Lednicer, Portage, and Edward E. Nishizawa, Schoolcraft, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed May 30, 1972, Ser. No. 258,016
Int. Cl. C08f *3/92*
U.S. Cl. 260—79.3 R **10 Claims**

1. A process for inhibiting the thrombogenic or clotting ability of materials which are susceptible to interaction with an aromatic sulfonyl nitrene which comprises

a. contacting the said material with a compound of the generic structure



wherein R and R_1 are the same or different and are selected from the group consisting of hydrogen, halogen, and alkyl of one to four carbon atoms, inclusive,

b. irradiating the said contacted material and compound of step (a) for a time sufficient to generate a nitrene,

c. converting the nitro group to a diazonium salt, and

d. coupling the diazonium salt to a compound which inhibits the thrombogenic or clotting activity of the material.

3,888,834

PROCESS FOR PREPARING IMPROVED ETHYLENE COPOLYMER

Kazuo Yamaguchi, Tokyo; Natsuki Kanoh, Sagamihara; Isao Ito, Tokyo, and Nobuo Enokido, Kawasaki, all of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Filed Apr. 25, 1973, Ser. No. 354,362
Claims priority, application Japan, Apr. 25, 1972, 47-41533
Int. Cl. C08f *1/42, 15/04, 15/40*
U.S. Cl. 260—80.7 **6 Claims**

1. A process for preparing an improved ethylene copolymer, which comprises:

copolymerizing ethylene and a diolefin selected from the group consisting of 1,3-butadiene and an alkyl substituted 1,3-butadiene, or ethylene, an α-olefin and a diolefin selected from the group consisting of 1,3-butadiene and an alkyl substituted 1,3-butadiene, wherein the mole ratio of said diolefin to said ethylene is 0.1 – 3.0, in the presence of a catalyst system comprising a first solid component prepared by reducing a mixture or a reaction product of (a) a titanium halide and (b) a vanadyl trialcoholate with an alkylaluminum dihalide at a temperature of 50° – 100°C; and

a second component of an organoaluminum compound.

3,888,835

METHOD FOR THE POLYMERIZATION OF COPOLYMERIZATION OF ETHYLENE

Akira Ito; Kazuhiro Matsuzaki, and Yoshio Morimoto, all of Nagoya, Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Filed July 5, 1972, Ser. No. 269,156
Claims priority, application Japan, July 22, 1971, 46-54824
Int. Cl. C08f *1/56, 3/06*
U.S. Cl. 260—88.2 R **9 Claims**

1. A method of polymerizing ethylene which comprises polymerizing or copolymerizing ethylene in a suspension polymerization system in the presence of a catalyst consisting of

A. a co-comminuted composition of the following components:

a. at least one component selected from the group consisting of titanium tetrachloride and titanium trichloride, said titanium tetrachloride comprising 1–35% by weight and said titanium trichloride comprising 1–80% by weight of component (A),

b. an aluminum halide-ether complex wherein the ether component thereof is a saturated or unsaturated ether of the formula R^1—O—R^2 wherein R^1 and R^2 each is a hydrocarbon residue or a halogen-substituted hydrocarbon residue or together form a cyclic ether, said aluminum halide-ether complex comprising 5–50% by weight of component (A) and

c. magnesium halide; and

B. an organo-aluminum compound.

3,888,836

PENTAPEPTIDE INTERMEDIATE OF LHRH AND DERIVATIVES THEREOF

Daniel F. Veber, and Stephen F. Brady, both of Westfield, N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed May 30, 1972, Ser. No. 257,623

Int. Cl. C07c *103/52*; A61k *27/00*

U.S. Cl. 260—112.5 4 Claims

1. The pentapeptide pyroglu-his-trp-ser-tyr, and hydrazide, azide, and lower alkyl ester derivatives thereof.

3,888,837

TUBERCULIN ACTIVE PROTEINS AND PEPTIDES FROM THE CELLS OF TUBERCLE BACILLI

Toru Tsumita, and Seishi Kuwabara, both of Tokyo, Japan, assignors to Mitsui Pharmaceuticals, Incorporated, Tokyo, Japan

Filed June 28, 1973, Ser. No. 374,663

Int. Cl. C07c *103/52*; C07g *7/00*; C08h *1/00*

U.S. Cl. 260—112.5 4 Claims

1. A tuberculin active simple protein from *Mycobacterium tuberculosis* strain Aoyama B which is composed of 89 amino acid residues and whose amino acid sequence is as follows

```
      1   2   3   4   5   6   7   8   9  10
H2N-Arg-Leu-Leu-Asp-Asp-Thr-Pro-Glu-Val-Lys- ....
                                  '
 27        68          70  71  72  73  74        88  89
Cys ....Cys ....Asp-Gly-Ser-Glu-Met- ....Ala-Lys-COOH.
```

3,888,838

DECAPEPTIDE HAVING LUTEINIZING HORMONE (LH)-AND FOLLICLE STIMULATING HORMONE (FSH)-RELEASING ACTIVITY, SALTS AND COMPOSITIONS THEREOF, A PROCESS FOR PREPARING SAME, AND INTERMEDIATES THEREFOR

Hans U. Immer; Verner R. Nelson, both of Montreal, Quebec, and Manfred K. Gotz, Hudson, Quebec, all of Canada, assignors to Ayerst McKenna and Harrison Ltd., Montreal, Canada

Filed July 10, 1972, Ser. No. 270,140

Int. Cl.[2] C07C *103/52*; C07G *7/00*; A61K *27/00*

U.S. Cl. 260—112.5 25 Claims

1. A process for preparing a decapeptide of the formula I H — Pyr — His — Trp — Ser — Phe — Gly — Leu — Arg — Pro — Gly — NH_2 in the form of its salt, which comprises treating the hexapeptide N-[N-[N-[N-[-(5-oxo-L-prolyl)-L-histidyl]-L-tryptophyl]-L-seryl]-L-phenylalanyl]glycine hydrazide trifluoroacetate in an anhydrous inert organic solvent with a strong mineral acid selected from the group consisting of hydrogen chloride, hydrogen bromide and sulfuric acid and an organic nitrite selected from the group consisting of t-butyl nitrite and isoamyl nitrite at a temperature within the range of from about −30°C to about −10°C, making the mixture alkaline by addition of a strong organic base, adding a solution of N-[N-[N-(N-L-leucyl-L-arginyl]-L-prolyl]glycinamide diacetate in an anhydrous inert organic solvent, agitating the mixture at a temperature within the range from about −30°C to about 0°C, and isolating the decapeptide of formula I as the strong mineral acid salt.

3,888,839

ISOLATED YEAST PROTEIN PRODUCT WITH INTACT RNA AND A PROCESS FOR MAKING SAME

Jon Albert Newell, Webster Groves; Robert Dudley Seeley, Crestwood, and Ernest Aleck Robbins, High Ridge, all of Mo., assignors to Anheuser-Busch, Incorporated, St. Louis, Mo.

Filed Nov. 29, 1972, Ser. No. 310,455

Int. Cl. A23j *1/18*

U.S. Cl. 260—112 R 9 Claims

4. A process for producing a substantially cell free yeast protein product comprising the steps of:

a. Rupturing yeast cells,

b. Extracting the protein from the ruptured yeast cells at a pH of about 5.5 to about 11 and a temperature of 0°C. to about 60°C. while maintaining the protein in soluble form,

c. Separating the ruptured yeast cells into an insolubles fraction and a solubles fraction,

d. Combining the solubles fraction and a food grade acid to a pH of about 3.5 to about 5.5 at a temperature of 0°–100°C. to insolubilize the protein, and

e. Separating the insolubilized protein from the solubles fraction.

3,888,840

NOVEL HYDRAZINOCARBOXAMIDE DERIVATIVES AND PREPARATION THEREOF

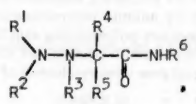
Amedeo Failli, Montreal; Verner R. Nelson, Kirkland; Hans U. Immer, St. Laurent, and Manfred K. Gotz, Hudson, Quebec, all of Canada, assignors to American Home Products Corporation, New York, N.Y.

Filed Feb. 7, 1973, Ser. No. 330,359

Int. Cl. C07c *103/52*; A61k *27/00*

U.S. Cl. 260—112.5 8 Claims

1. A compound of the formula:



in which R^1 and R^2 each are lower alkyl or R^1 and R^2 together with the nitrogen atom to which they are joined form a piperidino or morpholino radical; R^3 is hydrogen, lower alkanoyl, benzoyl, p-nitrobenzoyl, p-aminobenzoyl, p-chlorobenzoyl, isocyanoacetyl, N-formylglycyl or N-carbobenzoxyglycylglycyl;

R^4 is lower alkyl, CHR^7COOR^8 or $CH_2CH_2COOR^8$ wherein R^7 is hydrogen or phenyl and R^8 is hydrogen or lower alkyl; R^5 is hydrogen or lower alkyl; or R^4 and R^5 together with the carbon atom to which they are joined form a cyclohexylidene radical; and R^6 is CHR^9COY wherein R^9 is hydrogen or benzyl and Y is hydroxyl, lower alkoxy or amino, with the provisos that when Y is hydroxyl then R^8 is hydrogen, that when Y is lower alkoxy then R^8 is lower alkyl and that when Y is amino R^4 is lower alkyl.

3,888,841

PROCESS FOR DIAZOTIZING AROMATIC AMINES

Ernst Spietschka, Oberauroff, Taunus, and Josef Landler, Hofheim, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Germany

Filed July 10, 1972, Ser. No. 270,256

Claims priority, application Germany, July 10, 1971, 2134519

Int. Cl. C07c *113/04*

U.S. Cl. 260—141 2 Claims

1. A process for diazotizing a diazotizable amine compound which consists of the steps of: dissolving or suspending a diazotizable amine compound which does not carry a strongly

negative substituent in an excess of a heterocyclic base inert toward the action or compounds capable of splitting off nitrosyl groups, selected from the group consisting of pyridine, quinoline, picoline, lutidine and mixtures thereof; and diazotizing the said diazotizable amine compound at a temperature of from −15°C to 10°C and in the absence of acid conditions with a compound capable of splitting off nitrosyl groups selected from the group consisting of nitrosylsulfuric acid and nitrosyl chloride.

3,888,842

QUERCETIN DERIVATIVES

Michel Cazaux, Pessac, and Jean Cros, Ramonville, both of France, assignors to Societe Cortial, Paris, France

Filed Aug. 28, 1973, Ser. No. 392,309

Claims priority, application France, Aug. 31, 1972, 72.30873; July 6, 1973, 73.24835

Int. Cl. C07c *47/18*

U.S. Cl. 260—210 F **7 Claims**

1. Quercetin substituted in one or more of positions, 3, 7 and 4′ by the vicianosyl group.

3,888,843

4-CARBAMOYL-1-β-D-RIBOFURANOSYLIMIDAZOLIUM-5-OLATE

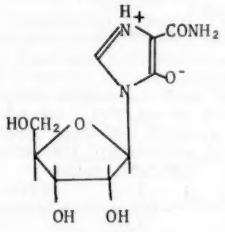
Kimio Mizuno; Takuji Ando; Masatoshi Tsujino; Masaki Takada; Munetoshi Yoshizawa; Tetsuo Matsuda, and Mitsuo Hayashi, all of Shizuoka, Japan, assignors to Toyo Jozo Kabushiki Kaisha, Shizuoka-ken, Japan

Filed June 12, 1973, Ser. No. 365,794

Int. Cl. C07d *51/52*

U.S. Cl. 260—211.5 R **1 Claim**

1. 4-carbamoyl-1-β-D-ribofuranosylimidazolium-5-olate, a compound of the formula



3,888,844

HALOGENATED ESTERS OF PHOSPHORUS-CONTAINING ACIDS (II)

Gaetano F. D'Alelio, 2011 E. Cedar St., South Bend, Ind. 46617

Continuation-in-part of Ser. No. 179,543, Sept. 10, 1971, Pat. No. 3,780,144, which is a continuation-in-part of Ser. No. 785,335, Dec. 19, 1968, abandoned. This application July 30, 1973, Ser. No. 383,600

Int. Cl. C08b *3/00*

U.S. Cl. 260—214 **30 Claims**

1. A polymeric ester having fire-retardant properties and having the formula $Q[OP(O)(ORCX{=}CXR')_2]_n$ wherein Q represents a polymeric organic moiety having a valency of n; *n* represents an integer of at least 2;

R represents a divalent hydrocarbon radical having 1–20 carbon atoms; R′represents X, hydrogen or R″;

R″ represents a monovalent hydrocarbon radical containing 1–20 carbon atoms; and

X represents chlorine or bromine;

said polymeric organic moiety being a hydroxy-containing polymer selected from the class consisting of (a) polymeric (hydroxyhydrocarbon) esters of acrylic, methacrylic and beta-chloroacrylic acids, (b) hydroxy-containing polystyrenes, (c) hydroxy-containing polymeric vinyl ethers, (d) polymeric alkanolamines, (e) linear phenolaldehyde polymers, (f) polymeric polyesters having unreacted hydroxy groups, (g) polyvinyl alcohols, partially etherified polyvinyl alcohols and partially esterified polyvinyl alcohols, and (h) cellulose, partially etherified cellulose and partially esterified cellulose.

3,888,845

PROCESS FOR PRODUCING EPSILON-CAPROLACTAM

Yutaka Fujita; Tatsuyuki Naruchi, and Eishin Yoshisato, all of Iwakuni, Japan, assignors to Teijin Limited, Osaka, Japan

Filed Mar. 5, 1971, Ser. No. 121,550

Claims priority, application Japan, Mar. 9, 1970, 45-20008; Apr. 10, 1970, 45-31012; Apr. 15, 1970, 45-32074; Oct. 12, 1970, 45-88773; Oct. 15, 1970, 45-90060; Nov. 19, 1970, 45-102166; Dec. 28, 1970, 45-123958

Int. Cl. C07d *41/06*

U.S. Cl. 260—239.3 A **8 Claims**

1. A process for producing ε-caprolactam which comprises contacting at least one compound selected from ε-caprolactone and C_1–C_4 lower alkyl esters of ε-hydroxycaproic acid with hydrogen and ammonia in the vapor phase at a temperature of 200° to 320°C. with a solid catalyst consisting essentially of

A. at least one oxide selected from the group consisting of titanium dioxide, alumina, alumina-silica and silica,

B. metallic copper, and

C. at least one component selected from the group consisting of metallic nickel and chromium sesquioxide the sum of the amounts of the metallic copper (B), the component (C) being 0 to 200 parts by weight.

3,888,846

PROCESS FOR 2[2-(1,3-DIAZACYCLOALK-2-ENYL)]BENZOPHENONE DERIVATIVES AND 1,3-DIAZACYCLOALKENYL[2,1-A]ISOINDOLE DERIVATIVES

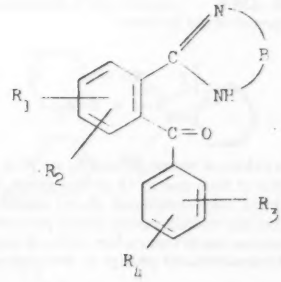
Werner Metlesics, Clifton, and Leo Henryk Sternbach, Upper Montclair, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation-in-part of Ser. No. 626,965, March 30, 1967, abandoned. This application May 18, 1967, Ser. No. 639,315

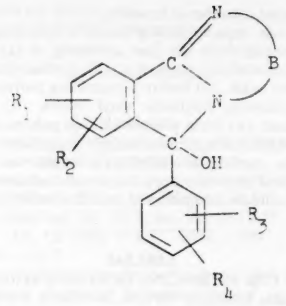
Int. Cl. C07d *51/28, 57/14, 53/02*

U.S. Cl. 260—239 BC **5 Claims**

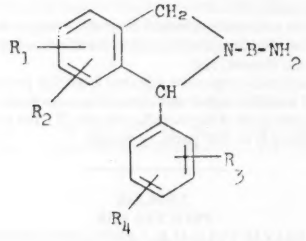
1. A process for the preparation of a compound of the formula



and its tautomer of the formula



wherein B represents an alkylene chain of 2 to 4 carbon atoms in which one or more of the hydrogens can be replaced by straight chain lower alkyl of 1 to 6 carbon atoms; and R_1, R_2, R_3 and R_4 are each independently selected from the group consisting of hydrogen, halogen, straight chain lower alkyl of 1 to 6 carbon atoms, lower alkoxy of 1 to 6 carbon atoms, hydroxy and trifluoromethyl which comprises treating a compound of the formula:



wherein B, R_1, R_2, R_3 and R_4 are as defined hereinabove with an oxidizing agent.

3,888,847

AZIRIDINYL HALOFORMIMIDES

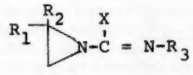
Donald A. Tomalia, and Thomas J. Giacobbe, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 76,649, Sept. 29, 1970, Pat. No. 3,754,032. This application May 11, 1973, Ser. No. 359,562

Int. Cl. C07d *23/06*

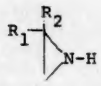
U.S. Cl. 260—239 E **8 Claims**

1. A compound of the formula



wherein X is chloro or bromo, R_1 and R_2 are H or lower alkyl and R_3 is alkyl of from one to 18 carbon atoms, cyclohexyl, phenyl, naphthyl, alkyl-substituted phenyl wherein the alkyl group has from one to eight carbon atoms, phenalkyl wherein the alkyl group has one to four carbon atoms, β-naphthylethyl, mono- or dihalosubstituted phenyl or mononitrosubstituted phenyl.

8. A process for producing the compound defined in claim 1 comprising reacting by contacting, in the presence of an acid acceptor, (a) an aziridine of the formula



with (b) an isocyanide dihalide of the formula $R_3—N\quad CX_2$, said process being conducted at a temperature of from about −20° to about 5°C.

3,888,848

AMPICILLIN-CHLORAL HYDRATE COMPLEX

Takeru Higuchi, and Kaneto Uekama, both of Lawrence, Kans., assignors to Alza Corporation, Palo Alto, Calif.

Filed Nov. 8, 1971, Ser. No. 196,441

Int. Cl. C07d *99/16*

U.S. Cl. 260—239.1 **1 Claim**

1. 6-(D-2-amino-2-phenylacetamido)penicillanic acid-2,2,2-trichloro-1,1-ethanediol complex.

3,888,849

17α-SUBSTITUTED-ALLENE-BEARING STEROIDS

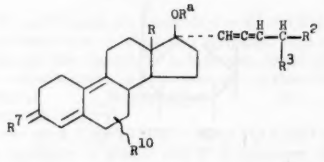
Imre Bacso, Morristown, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Continuation-in-part of Ser. No. 219,555, Jan. 20, 1972, abandoned. This application July 13, 1973, Ser. No. 379,160

Int. Cl.² C07C *173/10*

U.S. Cl. 260—239.5 **20 Claim**

1. A compound of the formula



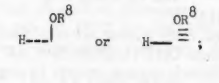
wherein

R is alkyl having from 1 to 4 carbon atoms;

R^a is a hydrogen atom, tetrahydropyran-2-yl, tetrahydrofuran-2-yl, 4-methoxytetrahydropyran-4-yl, alkanoyl having from 2 to 4 carbon atoms or acetoacetyl;

each of R^2 and R^3, independently is a hydrogen atom, or alkyl, provided that the total number of carbon atoms of R^2 and R^3 does not exceed 4 carbon atoms;

R^7 is oxo,



wherein

R^8 is a hydrogen atom, tetrahydropyran-2-yl, tetrahydrofuran-4-yl, 4-methoxytetrahydropyran-4-yl, alkanoyl having from 2 to 4 carbon atoms, or acetoacetyl; and

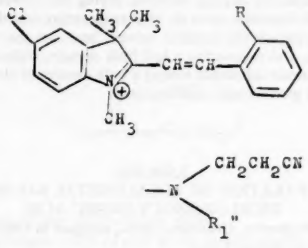
R^{10} is a hydrogen atom.

3,888,850
SUBSTITUTED P-AMINOSTYRYL-5-CHLOROINDOLINIUM DYES

Roland Entschel, Basel, and Viktor Kaeppeli, Allschwil, Basel, both of Switzerland, assignors to Sandoz, Inc., Basel, Switzerland

Continuation of Ser. No. 101,399, Dec. 24, 1970, abandoned. This application Apr. 9, 1973, Ser. No. 349,460
Int. Cl. C09b 23/14
U.S. Cl. 260—240.9 4 Claims

1. A compound of the formula



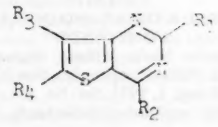
wherein
a. R is methyl, and
R''_1 is ehtyl, or
b. R is ethyl, and
R''_1 is 2-chloroethyl, and
A^- is an anion.

3,888,851
2,4-DIAMINO-SUBSTITUTED THIENO(3,2-D)PYRIMIDINES AND SALTS THEREOF

Berthold Narr; Josef Roch; Erich Müller, and Josef Nickl, all of Biberach an der Riss, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

Filed May 3, 1972, Ser. No. 249,782
Claims priority, application Germany, May 4, 1971, 2121950; July 26, 1971, 2137431; Mar. 29, 1972, 2215299
Int. Cl. C07d 99/10
U.S. Cl. 260—243 R 9 Claims

1. A compound of the formula



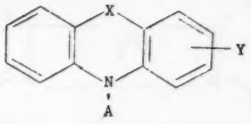
wherein:
one of R_1 and R_2 is piperazino, N''-methyl-piperazino, N'-benzyl-piperazino, N'-(β-hydroxy-ethyl)-piperazino, dimethyl-piperazino or 1-oxido-thiomorpholino,
the other of R_1 and R_2 is 1-oxido-thiomorpholino, 1,1-dioxido-thiomorpholino or 2-methyl-1-oxido-thiomorpholino,
provided, however, that R_1 and R_2 are other than 1-oxido-thiomorpholino and 1,1-dioxido-thiomorpholino or 2-methyl-1-oxido-thiomorpholino, respectively, at the same time,
one of R_3 and R_4 is hydrogen or methyl,
and the other of R_3 and R_4 is hydrogen, methyl, chlorine, bromine or nitro,
or a non-toxic, pharmacologically acceptable acid addition salt thereof.

3,888,852
10-IMIDOYLPHENOXAZINES

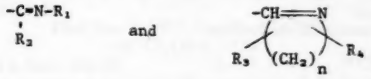
Yao Hua Wu, and Walter G. Lobeck, Jr., both of Evansville, Ind., assignors to Mead Johnson & Company, Evansville, Ind.

Filed Feb. 28, 1973, Ser. No. 336,671The portion of the term of this patent subsequent to Mar. 6, 1990, has been disclaimed.
Int. Cl. C07d 87/50
U.S. Cl. 260—244 R 13 Claims

1. A compound selected from the group consisting of 10-imidoylphenoxazines having the formula



and a non-toxic pharmaceutically acceptable acid addition salt thereof wherein
X represents oxygen
Y represents hydrogen, trifluoromethyl, halogen, dihalogen, lower alkyl of 1 to 4 carbon atoms inclusive, lower alkoxy of 1 to 4 carbon atoms inclusive; and
A is selected from the group consisting of



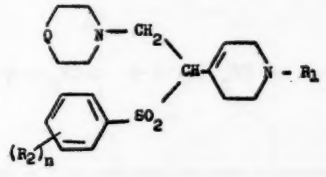
wherein
R_1 is lower alkyl of 1 to 4 carbon atoms inclusive or cycloalkyl of 3 to 6 carbon atoms inclusive;
R_2 is hydrogen or lower alkyl of 1 to 4 carbon atoms inclusive;
R_3 and R_4 are independent members selected from the group consisting of hydrogen or lower alkyl of 1 to 4 carbon atoms inclusive;
n is an integer of 3 to 5.

3,888,853
1,2,5,6-TETRAHYDROPYRIDINES

Robert E. Manning, Mountain Lakes, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Continuation of Ser. No. 194,687, Nov. 1, 1971, abandoned. This application Sept. 19, 1973, Ser. No. 398,582
Int. Cl. C07d 87/46
U.S. Cl. 260—247.1 M 2 Claims

1. A compound of the formula



(I)

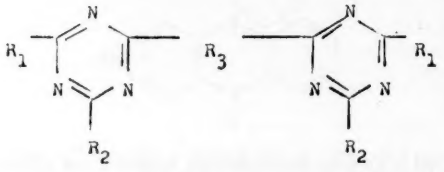
where
n is 0, 1 or 2
R_1 is lower alkyl and
R_2 is halo having an atomic weight of about 19 to 36, lower alkyl or lower alkoxy or
a pharmaceutically acceptable acid addition salt thereof.

3,888,854
BIS-TRIAZINE COMPOUNDS

Paul D. Schuman, Hawthorne, and Eugene C. Stump, Jr., Gainesville, both of Fla., assignors to PCR, Inc., Gainesville, Fla.

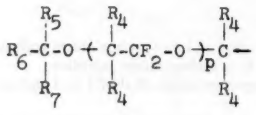
Filed Nov. 18, 1971, Ser. No. 200,212
Int. Cl. C07d 55/50
U.S. Cl. 260—248 CS 11 Claims

1. Compound of the formula:

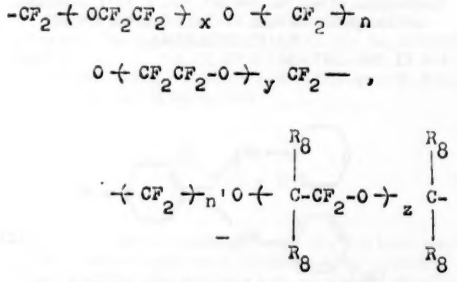


wherein R_1 and R_2 are independently selected from the group consisting of

a. perfluoroalkyl of 1 – 12 carbon atoms,
b. perhalogenated chlorofluoroalkyl of 1 – 11 carbon atoms, and
c. radicals of the formula:



wherein each R_4 is independently selected from the group consisting of F, Cl and perfluoroalkyl of 1 to 5 carbon atoms, and R_5, R_6 and R_7 are independently selected from the group consisting of F, Cl, perfluoroalkyl of 1 – 7 carbon atoms, ω-hydroperfluoroalkyl of 2 to about 12 carbon atoms, perhalogenated chlorofluoroalkyl of 1 to 7 carbon atoms, and p is a number from 1 – 20, and ω-hydroperfluoroalkyl of 3 to about 13 carbon atoms, and R_3 is a member selected from the group consisting of



perhalogenated chlorofluoroalkylene of 2 to about 20 carbon atoms, and mixtures thereof, wherein each R_8 is independently F, Cl, perfluoroalkyl of 1 – 5 carbon atoms, or perhalogenated chlorofluoroalkyl of 1 – 5 carbon atoms, x and y are independently numbered from 0 – 20, z is a number from 1 to 20, n is a number from 5 to 20, and n' is a number from 2 – 20.

3,888,855
PREPARATION OF LOW BULK DENSITY SODIUM DICHLOROISOCYANURATE DIHYDRATE

Sidney Berkowitz, Highland Park, N.J., assignor to FMC Corporation, New York, N.Y.

Filed July 13, 1973, Ser. No. 378,829
Int. Cl. C07d 55/38
U.S. Cl. 260—248 C 6 Claims

1. A process for the production of a storage-stable, free-flowing, thermal-decomposition resistant, low bulk density sodium dichloroisocyanurate dihydrate which comprises contacting water-wet sodium dichloroisocyanurate dihydrate with a water miscible organic solvent, drying the solvent treated sodium dichloroisocyanurate at a temperature less than about 48°C to remove the organic solvent and not the waters of hydration, and recovering a low bulk density, sodium dichloroisocyanurate dihydrate having a bulk density of about 0.1 to about 0.3 grams/cubic centimeter.

3,888,856
PREPARATION OF ALKALI METAL SALTS OF DICHLOROISOCYANURIC ACID

John A. Wojtowicz, Cheshire, Conn., assignor to Olin Corporation, New Haven, Conn.

Filed Sept. 4, 1974, Ser. No. 503,213
Int. Cl. C07d 55/40
U.S. Cl. 260—248 C 21 Claims

1. A process for preparing an alkali metal salt of dichloroisocyanuric acid which comprises reacting trichloroisocyanuric acid with an alkali metal salt of an acid selected from the group consisting of:

1. inorganic acids selected from the group consisting of cyanic acid, thiocyanic acid, hydrocyanic acid, nitrous acid, chlorous acid, silicic acid, aluminic acid, and boric acid,
2. aliphatic carboxylic acids selected from the group consisting of aliphatic monocarboxylic acids and hydroxy-substituted aliphatic monocarboxylic acids wherein said aliphatic group contains from one to about six carbon atoms, and aliphatic polycarboxylic acids and hydroxy-substituted aliphatic polycarboxylic acids wherein said aliphatic group contains from two to about six carbon atoms,

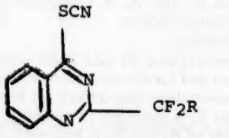
said reaction being conducted in the presence of water, and recovering said alkali metal salt of dichloroisocyanuric acid produced thereby.

3,888,857
FUNGICIDAL 4-THIOCYANO QUINAZOLINE COMPOUNDS

Antonius Gerhardus Maria Willems, Weesp, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 1, 1973, Ser. No. 384,685
Claims priority, application Netherlands, Aug. 9, 1972, 7,210,866
Int. Cl. Co7d 51/48
U.S. Cl. 260—251 Q 3 Claims

1. A 4-thiocyano-quinazoline of the formula



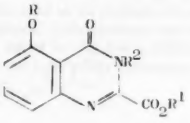
wherein R is a member selected from the group consisting of fluoro and difluoromethyl.

3,888,858
3,4-DIHYDRO-4-OXO-2-QUINAZOLINECARBOXYLIC ACIDS, SALTS AND ESTERS AS ANTI-ALLERGIC AGENTS

John H. Sellstedt, Pottstown; Charles J. Guinosso, King of Prussia, and Stanley C. Bell, Penn Valley, all of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Feb. 22, 1974, Ser. No. 444,945
Int. Cl. C07d *51/48*
U.S. Cl. 260—251 QA 8 Claims

1. A compound of the formula:



in which

R is alkyl of one to six carbon atoms;

R^1 is hydrogen, alkyl of one to six carbon atoms, an alkali metal cation or the ammonium ion; and

R^2 is hydrogen or alkoxymethyl containing from two to seven carbon atoms.

3,888,859
METHOD FOR A FREEZE DRIED FORTIFIED COFFEE HAVING IMPROVED RATE OF SOLUBILITY

George B. Ponzoni, Spring Valley, N.Y., and Richard J. Leonard, Totowa, N.J., assignors to General Foods Corporation, White Plains, N.Y.

Filed Oct. 2, 1972, Ser. No. 294,063
Int. Cl. A23l *3/36*; A23f *1/06*
U.S. Cl. 426—262 4 Claims

1. A method for producing a readily-soluble, fortified, freeze-dried coffee product comprising the steps of:

a. obtaining a coffee extract containing from about 20 to 30% soluble solids,

b. increasing the solids concentration of said coffee extract to between 35 and 50% solids by the addition of fortifying ingredients selected from the group consisting of sugars, hydrolized cereal solids, proteins, vitamins, minerals and combinations thereof,

c. continuously cooling the fortified extract from a temperature of between 35° and 40°F to its eutectic point over a period of at least 40 minutes,

d. further cooling the fortified extract to thoroughly freeze the extract,

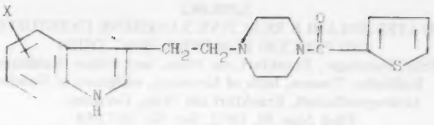
e. freeze-drying the thoroughly frozen extract.

3,888,860
3-[2-(4-THIENOYLPIPERAZIN-1-YL)ETHYL]INDOLES

Richard A. Schnettler, Brown Deer, and John T. Suh, Mequon, both of Wis., assignors to Colgate-Palmolive Company, New York, N.Y.

Filed Jan. 7, 1974, Ser. No. 431,094
Int. Cl. C07d *51/70*
U.S. Cl. 260—268 BC 3 Claims

1. A compound selected from a compound of the formula



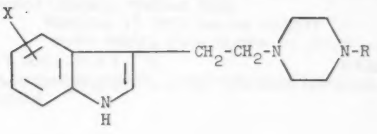
in which X is hydrogen, halogen, hydroxy and methoxy, and pharmaceutically acceptable acid addition salts thereof.

3,888,861
3-[2-(4-SUBSTITUTED-PIPERAZIN-1-YL)ETHYL]INDOLES

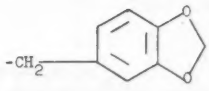
Richard A. Schnettler, Brown Deer, and John T. Suh, Mequon, both of Wis., assignors to Colgate-Palmolive Company, New York, N.Y.

Filed Jan. 7, 1974, Ser. No. 431,106
Int. Cl. C07d *51/70*
U.S. Cl. 260—268 BC 9 Claims

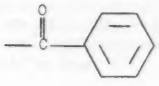
1. A compound selected from compounds of the formula



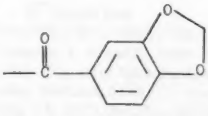
in which R is



;



; and



and X is hydrogen, halogen, trifluoromethyl, or lower alkoxy of one to four carbon atoms, and pharmaceutically acceptable acid addition salts thereof.

3,888,862

WATER-SOLUBLE REACTIVE XANTHENE DYESTUFFS AND PROCESS FOR PREPARING THEM

Fritz Meininger, Frankfurt am Main, and Folker Kohlhaas, Kelkheim, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

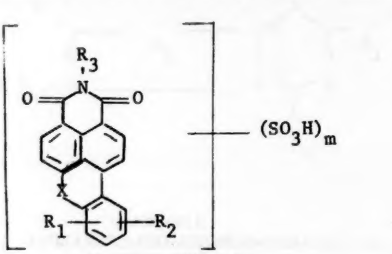
Filed June 30, 1972, Ser. No. 267,958

Claims priority, application Germany, July 2, 1971, 2132963

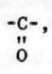
Int. Cl. C07d ***35/00***

U.S. Cl. 260—281 **6 Claims**

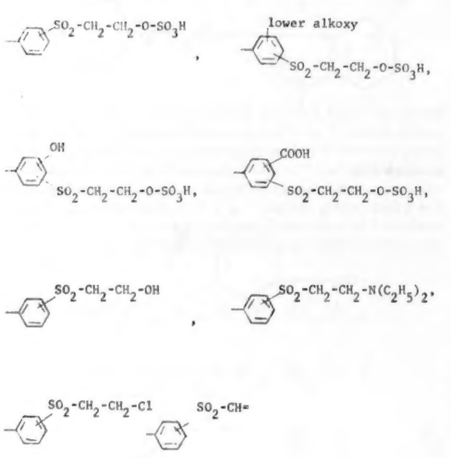
1. A water-soluble reactive xanthene dyestuff of the formula

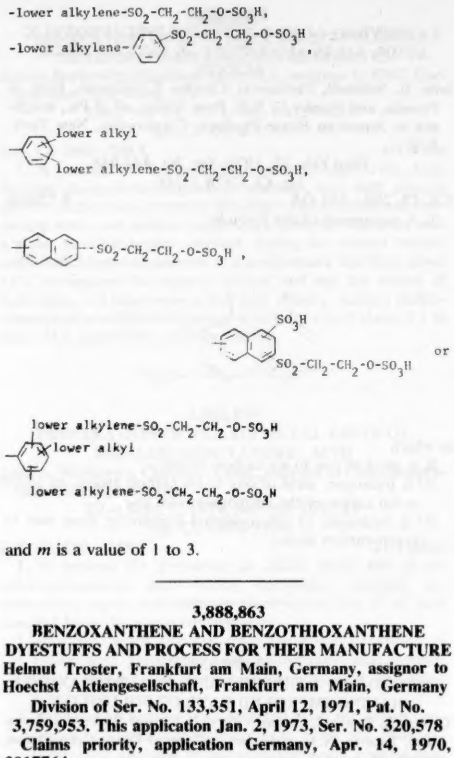


wherein R_1 and R_2 each is hydrogen, chlorine, bromine, lower alkyl or lower alkoxy, X is sulfur, oxygen or



R_3 is





and *m* is a value of 1 to 3.

3,888,863

BENZOXANTHENE AND BENZOTHIOXANTHENE DYESTUFFS AND PROCESS FOR THEIR MANUFACTURE

Helmut Troster, Frankfurt am Main, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

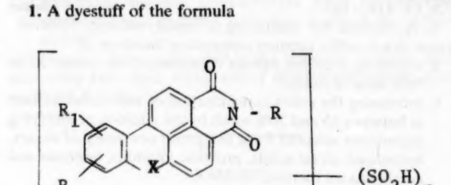
Division of Ser. No. 133,351, April 12, 1971, Pat. No. 3,759,953. This application Jan. 2, 1973, Ser. No. 320,578

Claims priority, application Germany, Apr. 14, 1970, 2017764

Int. Cl. C07d ***39/00***

U.S. Cl. 260—281 **7 Claims**

1. A dyestuff of the formula



wherein X is oxygen or sulfur, R is hydrogen, amino, lower alkyl, cyclohexoxy lower alkyl, lower alkoxy-lower alkyl, phenyl, chlorophenyl, lower alkyl phenyl, di-lower alkyl phenyl, R_1 and R_2 each is hydrogen, chlorine, bromine, lower alkyl or lower alkoxy, and *n* is a value from 1 to 3.

3,888,864

AMINO LOWER ALKYL ETHER DERIVATIVES OF OPIUM ALKALOIDS

Roy Cleeland, Jr., Short Hills, N.J., and Hans Jacob Hager, New York, N.Y., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed June 29, 1973, Ser. No. 374,849

Int. Cl. C07d ***43/28, 43/32***

U.S. Cl. 260—285 **3 Claims**

1. An amino lower alkyl ether of the phenolic hydroxyl group of morphine, heroin and codeine wherein the lower alkyl has two to eight carbon atoms.

3,888,865
PROCESS FOR THE PREPARATION OF EBURNAMONINES

Csaba Szantay; Lajos Szabo; Janos Kreidl; Gyorgy Kalaus; Tibor Keve; Peter Turczanyi; Istvan Polgar; Maria Farkas nee Kirjak, and Katalin Lakszner, all of Budapest, Hungary, assignors to Richter Gedeon Vgyeszeti Gyzr Rt., Budapest, Hungary

Filed Sept. 14, 1973, Ser. No. 397,217
Int. Cl. C07d *33/50*
U.S. Cl. 260—288 **5 Claims**

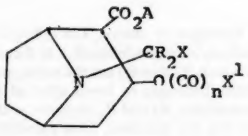
1. A process for the preparation of racemic or optically active (dextrorotatory or levorotatory) eburnamonine by the oxidation of vincaminic acid, which comprises the step of reacting vincaminic acid in an organic solvent selected from aliphatic and aromatic hydrocarbons and mixtures thereof, with an oxidizing agent having low solubility in said solvent medium and selected from silver carbonate, silver oxide and manganese dioxide.

3,888,866
NITROGEN DERIVATIVES OF BENZOYL ECGONINE

Richard K. Leute, Sunnyvale, and Gunner Bolz, Woodside, both of Calif., assignors to Syva Company, Palo Alto, Calif.

Filed June 1, 1973, Ser. No. 365,915
Int. Cl. C07d *43/06*
U.S. Cl. 260—292 **12 Claims**

1. A compound of the formula:



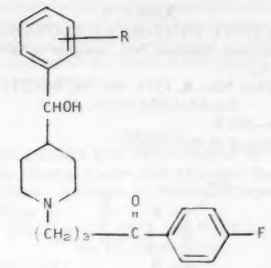
wherein:
A is hydrogen or methyl;
R is hydrogen or alkyl of from 1 to 3 carbon atoms;
X is hydrogen or ϕ—Y;
X^1 is hydrogen, phenyl or ϕ—Y;
ϕ is phenylene;
n is zero when X^1 is hydrogen and is one when X^1 is other than hydrogen; and
Y is amino or diazonium, having a neutral or weakly basic counterion,
there being only one ϕ—Y per molecule.

3,888,867
4-[4-(ALPHA-HYDROXYBENZYL)PIPERIDINO]4'-FLUOROBUTYROPHENONE DERIVATIVES

Albert Anthony Carr, Cincinnati, Ohio, assignor to Richardson-Merrell Inc., Wilton, Conn.

Continuation-in-part of Ser. No. 249,886, May 3, 1972, Pat. No. 3,852,455, which is a continuation of Ser. No. 93,495, Nov. 27, 1970, abandoned. This application Nov. 2, 1973, Ser. No. 412,101
Int. Cl. C07d *29/20*
U.S. Cl. 260—293.8 **6 Claims**

1. A compound of the formula



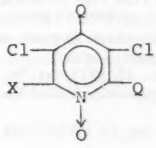
wherein R is a member selected from the group consisting of hydrogen, chlorine, fluorine, bromine, alkyl having from one to four carbon atoms, alkoxy having from one to four carbon atoms, thioalkoxy having from one to three carbon atoms, trifluoromethyl, phenyl or phenoxy; or a pharmaceutically acceptable acid addition salt thereof.

3,888,868
PREPARATION OF CHLOROPYRIDYLSULFONE-N-OXIDES

Demetrios Kyriacou, Clayton, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Filed Dec. 17, 1973, Ser. No. 425,571
Int. Cl. C07d *31/48*
U.S. Cl. 260—294.8 F **6 Claims**

1. A method of preparing compounds which correspond to the formula



wherein X represents hydrogen or chloro and each Q represents hydrogen, chloro or loweralkylsulfonyl ($—SO_2R$, wherein R represents a straight or branched chain loweralkyl radical of from one to four carbon atoms), with the proviso that at least one Q is always loweralkylsulfonyl which comprises reacting an alkylthio- or alkylsulfonyl polychloropyridine with hydrogen peroxide and concentrated sulfuric acid at temperatures of from about 45° to about 75°C.

3,888,869
BIS (THIOCYANOMETHYLTHIO) THIADIAZOLES

R. Garth Pews; Christian T. Goralski, both of Midland, and George A. Burk, Bay City, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Aug. 13, 1973, Ser. No. 387,984
Int. Cl. C07d *91/60, 91/62*
U.S. Cl. 260—302 SD **3 Claims**

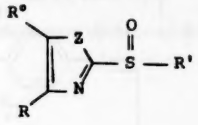
1. A member of the group consisting of [2,5-bis-(thiocyanomethylthio)-1,3,4-thiadiazole] and [3,5-bis(thiocyanomethylthio)-1,2,4-thiadiazole].

3,888,870
2-SULFINYL-THIAZOLES AND OXAZOLES

Thomas E. Jackson, Madison, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

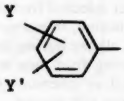
Filed Mar. 8, 1974, Ser. No. 449,511
Int. Cl. C07d 91/32, 85/44
U.S. Cl. 260—302 S 12 Claims

1. A compound of the formula:



wherein

R° and R are independently hydrogen, lower alkyl of 1 to 4 carbon atoms or phenyl of the formula:



where Y and Y′ are independently hydrogen, halo of atomic weight of from 18 to 80, lower alkyl of 1 to 4 carbon atoms, lower alkoxy of 1 to 4 carbon atoms or trifluoromethyl,

R′ is alkyl of 1 to 6 carbon atoms, and

Z is an oxygen or a sulfur atom, with the proviso that at least one of R° and R is phenyl as defined above.

3,888,871
PROCESS FOR THE PREPARATION OF 4-CHLORO-2-HYDROXYBENZOTHIAZOLE

James L. Lowe, Nottingham, England, assignor to The Boots Co., Ltd., Nottingham, England

Filed Nov. 23, 1973, Ser. No. 418,733
Claims priority, application United Kingdom, Dec. 1, 1972, 55684/72
Int. Cl. C07d 91/44
U.S. Cl. 260—304 7 Claims

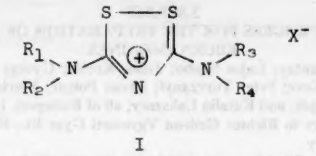
1. In a process for preparing 4-chloro-2-hydroxybenzothiazole which comprises diazotising 2-amino-4-chlorobenzothiazole hydrohalide in the presence of a solvent and hydrolysing the product, the improvement consisting of conducting the diazotisation in the presence of a halogenated aliphatic hydrocarbon solvent in which the major products of the diazotisation reaction are soluble to the extent of at least 10% w/v at 20°C, as said solvent.

3,888,872
N-ALKOXY-N-ALKYLAMINO SUBSTITUTED DITHIAZOLIUM SALTS

Russell Frank Bellina, Wilmington, Del., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.

Filed Nov. 8, 1972, Ser. No. 304,792
Int. Cl. C07d 91/70
U.S. Cl. 260—306.8 R 3 Claims

1. Compounds of formula



I

where

R_1 and R_3 are C_1–C_2 alkyl;

R_2 is C_1–C_2 alkyl or C_1–C_2 alkoxyl;

R_4 is C_1–C_2 alkoxyl; and

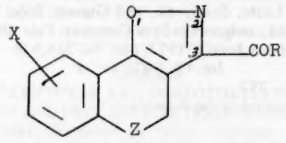
X^- is an anion of the corresponding acid HX having an ionization contant of at least 1×10^{-7}.

3,888,873
4H(1)BENZOTHIOPYRANO(3,4-D)-ISOXAZOLES

Jules Freedman, Thiensville, Wis., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Aug. 27, 1973, Ser. No. 391,950
Int. Cl. C07d 85/22
U.S. Cl. 260—307 H 5 Claims

1. A compound of the formula



I

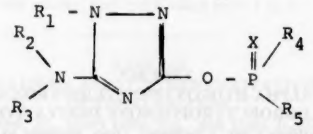
in which X is hydrogen or chloro, Z is —S(O)— or —S(O)-(O)—, R is hydroxyl, lower alkoxy of 1 to 4 carbon atoms or $N(R_3)(R_4)$, in which R_3 and R_4 are the same or different and are selected from hydrogen or lower alkyl of 1 to 4 carbon atoms, or, alternatively, R_3 and R_4, together with the nitrogen atom to which they are attached, form pyrrolidino.

3,888,874
PHOSPHORUS ESTERS OF 5-AMINO-1,2,4-TRIAZOL-3-L

Dag Dawes, Pratteln; Willy Meyer, Basel, and Beat Bohner, Binningen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed May 25, 1973, Ser. No. 364,175
Claims priority, application Switzerland, June 19, 1972, 9113/72; Apr. 18, 1973, 5501/73
Int. Cl. C07f 9/08, 9/16, 9/24
U.S. Cl. 260—308 DR 5 Claims

1. A compound of the formula



wherein R_1 represents C_1—C_6 alkyl or cyclopentyl; R_2 represents hydrogen, C_1—C_6 alkyl or allyl; R_3 represents hydrogen, C_1—C_6 alkyl, allyl, phenyl or benzyl; or R_2 and R_3 together with the nitrogen atom to which they are bonded represent morpholino or pyrrolidino; R_4 represents C_1—C_6 alkoxy or C_1—C_6 allkylthio; R_5 represents C_1—C_6 alkyl, C_1—C_6 alkoxy, C_1—C_6 alkylamino or phenyl; and X represents oxygen or sulphur.

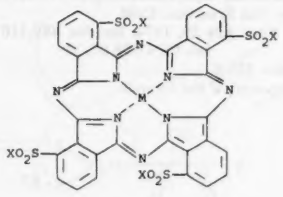
3,888,875

NOVEL PROCESSES FOR PHOTOGRAPHIC PRODUCTS

Henry Bader, Newton Center, and Donald O. Rickter, Arlington, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

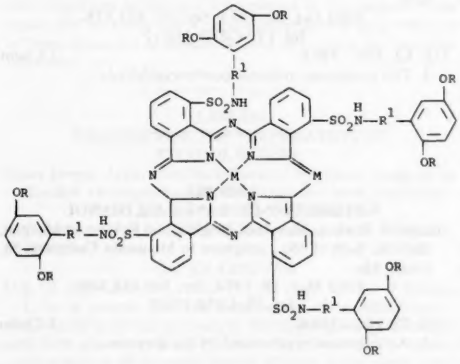
Filed Aug. 29, 1973, Ser. No. 392,655
Int. Cl. C09b 47/08
U.S. Cl. 260—314.5 12 Claims

1. In a process comprising the step of reacting a compound of the formula:



where X is a halogen and M is a metal selected from the group consisting of cobalt, nickel, copper, chromium, magnesium and zinc with an amine of the formula:

where R is an alkyl radical having from 1–6 carbon atoms to provide a compound of the formula:



wherein R is an alkyl radical having from 1–6 carbon atoms and R^1 is an alkylene radical having from 1–6 carbon atoms; the improvement wherein the compounds are reacted in a medium comprising acid neutralizing reagents and said medium comprises a mixture of water and a solvent which is a solvent for said amine but which is not miscible in said water to any substantial extent.

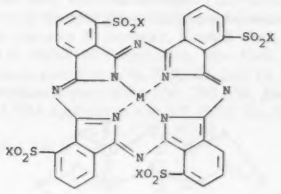
3,888,876

NOVEL PROCESSES FOR PHOTOGRAPHIC PRODUCTS

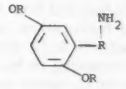
Henry Bader, Newton Center, and Alexander Boag, Arlington, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Aug. 29, 1973, Ser. No. 392,656
Int. Cl. C09b 47/08
U.S. Cl. 260—314.5 10 Claims

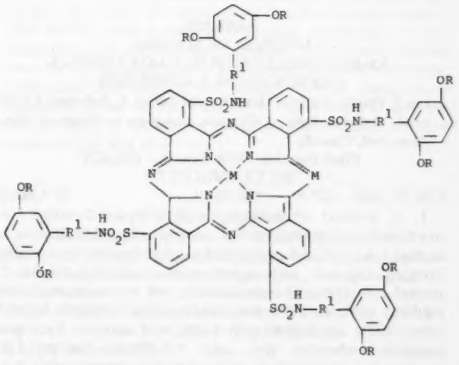
1. In a process comprising the step of reacting a compound of the formula:



where X is a halogen and M is a metal selected from the group consisting of cobalt, nickel, copper, chromium, magnesium and zinc with an amine of the formula:



where R is an alkyl radical having from 1-6 carbon atoms to provide a compound of the formula:



where R is an alkyl radical having from 1–6 carbon atoms and R^1 is an alkylene radical having from 1–6 carbon atoms; the improvement wherein the compounds are reacted in an aqueous medium comprising acid neutralizing reagents and said aqueous medium comprises from about 5 to about 25 percent by volume of a solvent which is a solvent for said amine and also miscible in said aqueous medium.

3,888,877

MACROCYCLIC COMPOUNDS AND COMPLEXES THEREOF

Jean-Marie Lehn, Strasbourg, France, assignor to Schering Corporation, Kenilworth, N.J.

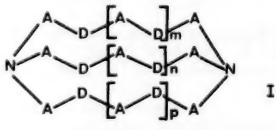
Continuation-in-part of Ser. No. 43,979, June 5, 1970, abandoned. This application Mar. 26, 1973, Ser. No. 344,682

Claims priority, application United Kingdom, June 11, 1969, 29564/69; Feb. 17, 1970, 7594/70

Int. Cl. C07d *93/00*

U.S. Cl. 260—327 R **24 Claims**

1. A macrocyclic compound selected from the group consisting of a compound of following formula I:



I

wherein each A is a hydrocarbon radical having from 2 to 8 carbon atoms;

each D is a member selected from the group consisting of oxygen, sulfur, a hydrocarbon radical having up to 8 carbon atoms, and =N—R (R being a member selected from the group consisting of hydrogen, a hydrocarbon radical having up to 12 carbon atoms, an aryl hydrocarbonsulfonyl radical having up to 12 carbon atoms, a lower alkoxycarbonyl radical, a lower alkoxycarbonylmethylene radical and a carboxymethylene radical); at least two of said D members being heterosubstituents selected from the group consisting of oxygen, sulfur and =N—R;

m, *n*, and *p* are integers from 0 to 5;

and N-oxides of formula I;

ammonium quaternary salts of formula I;

and acid addition salts of formula I.

3,888,878

METHOD OF MAKING 5,6-DIHYDRO-2-METHYL-1,4-OXATHIIN-3-CARBOXAMIDE 4,4-DIOXIDES

Gyan S. Pande, Guelph, Ontario, and Julius A. Balatoni, Kitchener, Ontario, both of Canada, assignors to Uniroyal Inc., Montreal, Canada

Filed Dec. 24, 1970, Ser. No. 101,429

Int. Cl. C07d *89/14*

U.S. Cl. 260—327 P **27 Claims**

1. A method of oxidizing a 5,6-dihydro-2-methyl-1,4-oxathiin-3-carboxamide to the corresponding 5,6-dihydro-2-methyl-1,4-oxathiin-3-carboxamide 4,4-dioxide comprising bringing together with agitation the said 5,6-dihydro-2-methyl-1,4-oxathiin-3-carboxamide, and a two-phase liquid medium made up of formic acid, an inert organic solvent substantially immiscible with water, and aqueous hydrogen peroxide, whereby the said 5,6-dihydro-2-methyl-1,4-oxathiin-3-carboxamide is oxidized to the corresponding 5,6-dihydro-2-methyl-1,4-oxathiin-3-carboxamide 4,4-dioxide, and thereafter recovering the said 5,6-dihydro-2-methyl-1,4-oxathiin-3-carboxamide 4,4-dioxide from the reaction mixture.

3,888,879

FUNGICIDAL N-POLYHALOALKYLTHIOSULFONAMIDOTHIOPHENES

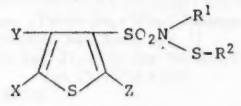
Laroy H. Edwards, Napa, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed July 29, 1974, Ser. No. 489,310

Int. Cl. C07d *63/00*

U.S. Cl. 260—329 S **10 Claims**

1. A compound of the formula



wherein X is fluoro, chloro or bromo, Y is hydrogen, fluoro, chloro or bromo, Z is fluoro, chloro or bromo, R^1 is alkyl of 1 to 6 carbon atoms, phenyl or phenyl substituted with up to 2 of the same or different substituents selected from the group consisting of fluoro, chloro, bromo and alkyl of 1 to 3 carbon atoms, and R^2 is polyhaloalkyl of 1 to 3 carbon atoms and 2 to 7 of the same or different halogens selected from the group consisting of fluoro, chloro and bromo.

3,888,880

SYNTHESIS OF DIETHER-ALDEHYDES AND DIETHER-LCOHOLS

Thomas C. Snapp, Jr., and Alden E. Blood, both of Longview, Tex., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 30, 1973, Ser. No. 411,118

Int. Cl.² C07D *319/12*

U.S. Cl. 260—340.6 **1 Claim**

1. The compound p-dioxanecarboxyaldehyde.

3,888,881

3-HYDROXY-P-DIOXANE-2-METHANOL

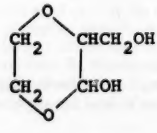
Russell D. Harken, Maryland Heights, and F. Wyman Morgan, Ballwin, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Mar. 18, 1974, Ser. No. 452,309

Int. Cl. C07d *15/12*

U.S. Cl. 260—340.6 **1 Claim**

1. A compound represented by the formula

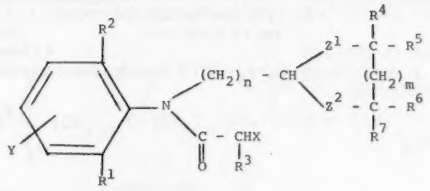


3,888,882
N-ALPHA-HALOACETYL-N-(1,3-DIOXAN-2-YLALKYL)ANILIDS

Sidney B. Richter, Chicago, and John Krenzer, Oak Park, both of Ill., assignors to Velsicol Chemical Corporation, Chicago, Ill.

Division of Ser. No. 357,746, May 7, 1973, Pat. No. 3,859,308. This application June 3, 1974, Ser. No. 475,544
Int. Cl. C07d *13/04;* A01n *9/28*
U.S. Cl. 260—340.7 4 Claims

1. A compound of the formula



wherein Y is selected from the group consisting of hydrogen, lower alkyl and halogen; R^1 is selected from the group consisting of hydrogen, lower alkyl and lower alkoxy; R^2 is lower alkyl; R^3, R^4, R^5, R^6 and R^7 are independently selected from the group consisting of hydrogen and lower alkyl; X is halogen; m is the integer 1; Z^1 and Z^2 are oxygen; and n is an integer from 1 to 2.

3,888,883
PRODUCTION OF COUMARIN

Nils J. Christensen, Palatine, and Ted Symon, Lombard, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed Aug. 1, 1973, Ser. No. 384,762
Int. Cl. C07d *7/28*
U.S. Cl. 260—343.2 R 6 Claims

1. A process for the production of coumarin which comprises continuously passing o-methyl coumarate through a reaction zone containing a refractory oxide packing at cyclization conditions including a temperature in the range of from about 200° to about 350° C. and a liquid hourly space velocity of from about 0.1 to about 3.0, and recovering the resultant coumarin.

3,888,884
PROCESS FOR THE PREPARATION OF PIVALOLACTONE

Hans-Jurgen Arpe, Fischbach/Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed June 6, 1972, Ser. No. 260,277
Claims priority, application Germany, June 8, 1971, 2128406
Int. Cl. C07d *3/00*
U.S. Cl. 260—343.9 9 Claims

1. In a process for the preparation of α,α-dimethyl-β-propiolactone (pivalolactone) by thermally splitting off acetic acid from β-acetoxy-pivalic acid in the presence of a carrier catalyst having alkali metal and/or alkaline earth metal compounds selected from the group consisting of an oxide, a hydroxide, hydrogen-carbonate, carbonate or salt of a carboxylic acid having up to 4 carbon atoms of lithium, sodium, potassium, rubidium, caesium, magnesium, calcium, strontium or barium, the improvement which consists essentially of using a silicic acid carrier in which more than 50% of the pore volume is attributable to pores having a pore diameter of from 100 to 1000 A.

3,888,885
PROCESS FOR THE PREPARATION OF 4-CHLORO-NAPHTHALIC ACID ANHYDRIDE

Walter Deucker, Neuenhain, Taunus, and Helmut Troster, Frankfurt am Main, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

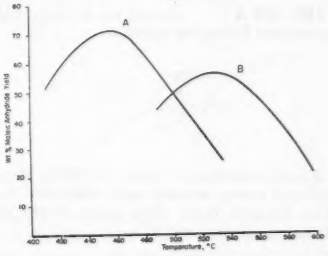
Filed Aug. 28, 1973, Ser. No. 392,176
Claims priority, application Germany, Aug. 30, 1972, 2242513
Int. Cl. C07d *7/20*
U.S. Cl. 260—345.2 4 Claims

1. A process for the preparation of 4-chloro-naphthalic acid anhydride, wherein an alkali metal salt of naphthalic acid is chlorinated in an aqueous solution at a pH value of between 6.8 to 9.0 and at a temperature of from 0° to 30°C.

3,888,886
OXIDATION OF ALKANES TO MALEIC ANHYDRIDE USING PROMOTED VANADIUM-PHOSPHORUS CATALYST

Lewis B. Young, Kendall Park; Benjamin Weinstein, Morganville, and Anthony T. Jurewicz, Kendall Park, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 379,667, July 16, 1973, which is a continuation-in-part of Ser. No. 261,030, June 8, 1972, abandoned. This application Apr. 17, 1974, Ser. No. 461,777
Int. Cl. C07c *57/14*
U.S. Cl. 260—346.8 22 Claims



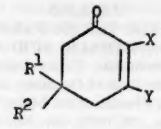
1. An improved process for oxidizing an alkane or cycloalkane to maleic anhydride, that comprises contacting a mixture of a molecular oxygen-containing gas and an alkane having 4–10 carbon atoms, a cycloalkane having between 4 and 10 carbon atoms, or a mixture of alkanes and cycloalkanes having between 4 and 10 carbon atoms at a temperature of about 300°–600°C., with a catalyst consisting essentially of vanadium, phosphorus and oxygen promoted with a metal selected from the group consisting of chromium, hafnium, zirconium, lanthanum, and cerium; the atomic ratio of phosphorus/vanadium being between about 0.5 and about 2; and the atomic ratio of promoter metal/vanadium being between about 0.0025 and about one.

3,888,887
DERIVATIVES OF 3-AMINO-2-HALO-2-CYCLOHEXEN-1-ONE

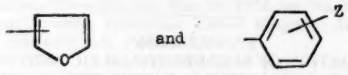
Ivo L. Jirkovsky, Montreal, Quebec, Canada, assignor to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 217,958, Jan. 14, 1972, Pat. No. 3,823,189. This application May 6, 1974, Ser. No. 467,181
Int. Cl. C07c *87/36;* C07d *5/16*
U.S. Cl. 260—347.7 5 Claims

1. A compound of the formula



in which R^1 and R^2 both are hydrogen or lower alkyl; X is selected from the group consisting of chlorine, bromine and iodine and Y is amino or $NH(CH_2)_nR^3$ wherein *n* is an integer from 1 to 2 and R^3 is a radical selected from the group consisting of



in which Z is hydrogen, halo or trifluoromethyl.

3,888,888

INSECTICIDAL ACTIVE GERANYL AND CITRONYL AMINE DERIVATIVES AND THEIR EPOXIDES

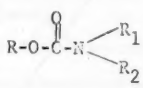
Ferenc M. Pallos, Walnut Creek, and Julius J. Menn, Saratoga, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 172,203, Aug. 16, 1971, abandoned. This application Apr. 5, 1973, Ser. No. 348,457

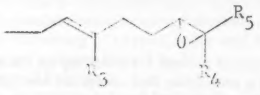
Int. Cl. C07d *1/22*

U.S. Cl. 260—348 A **11 Claims**

1. A compound having the formula:



wherein R is selected from the group consisting of cyclohexyl and substituted phenyl wherein said substituents can be selected from halogen, lower alkyl, lower alkoxy and lower thioalkyl; R_1 is hydrogen; and R^2 is



wherein R_3, R_4 and R_5 are independently selected from methyl and ethyl.

3,888,889

PROCESS FOR PROPYLENE OXIDE

Alexander John Kolombos, Sutton; Colin Christopher McCain, Horley, and Eric Andrew Porter, Sutton, all of England, assignors to BP Chemicals International Limited, London, England

Filed June 18, 1973, Ser. No. 370,923

Claims priority, application United Kingdom, June 27, 1972, 29954/72

Int. Cl. C07d *1/12*

U.S. Cl. 260—348.5 **21 Claims**

1. A process for the production of propylene oxide comprising reacting propylene and a molecular oxygen containing gas in the vapor phase at a temperature between about 180° to 300°C and at a pressure between 1 and 20 atmospheres in the presence of a catalyst composition comprising elemental silver modified on its surface by an additive which is a compound of a Group VB or Group VIB metal, the amount of said additive on the surface of said elemental silver is from 1×10^{-6} to 100 $\times 10^{-6}$ gram moles per gram of silver having a surface area of one square meter.

3,888,890

CERTAIN 1-ALKYL-9,10-ANTHRAQUINONES AND THEIR 5,6,7,8-TETRAHYDRO DERIVATIVES AND THE USE OF THE LATTER IN THE PRODUCTION OF HYDROGEN PEROXIDE

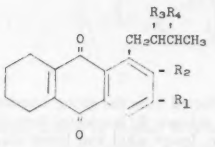
Jack R. Kirchner, and Lawrence G. Vaughn, both of Wilmington, Del., assignors to E. I. du Pont de Nemours & Co., Wilmington, Del.

Division of Ser. No. 79,643, Oct. 9, 1970. This application Aug. 31, 1972, Ser. No. 285,124

Int. Cl. C09b *1/00*

U.S. Cl. 260—369 **4 Claims**

1. A 5,6,7,8-tetrahydro-1-alkyl-9,10-anthraquinone having the formula:



in which each of R_1, R_2, R_3 and R_4 is hydrogen or a 1 to 8 carbon straight chain alkyl hydrocarbon group.

3,888,891

SILICONE-COMPATIBLE DYESTUFFS

Carl Mayn Smith, White Bear Lake, and George Van Dyke Tiers, St. Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed July 26, 1972, Ser. No. 275,190

Int. Cl. C08g *51/04*

U.S. Cl. 260—375 **1 Claim**

1. A clear, transparent and colored, cured silicone polymer comprising, diffused or homogeneously dispersed therein, about 0.01 to about 5% tris(trimethylsilyloxy)silylalkylamino substituted organic dyestuff.

3,888,892

LIQUID CRYSTALLINE COMPOUNDS

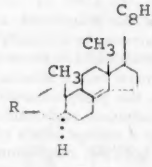
Lewis B. Leder, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 24, 1972, Ser. No. 300,050

Int. Cl. C07c *169/58, 169/60*

U.S. Cl. 260—397.2 **4 Claims**

1. Liquid crystalline compounds having a cholesteric mesophase which are represented by the formula



wherein R represents a member selected from the group consisting of halogens, aliphatic ester radicals having from three

to fifteen carbon atoms and carbonate radicals having up to and including fifteen carbon atoms.

3,888,893

UNSATURATED AMIDES

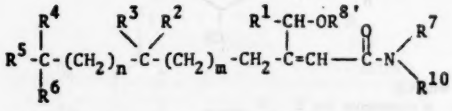
John B. Siddall, 2470 Greer St., Palo Alto, Calif. 94303

Division of Ser. No. 153,074, June 14, 1971, Pat. No. 3,755,356, which is a continuation-in-part of Ser. Nos. 860,086, Sept. 22, 1969, abandoned, and Ser. No. 874,678, Nov. 6, 1969, Pat. No. 3,631,080. This application Feb. 16, 1973, Ser. No. 333,260

Int. Cl. C07c *103/30*

U.S. Cl. 260—404 **9 Claims**

1. A compound selected from those of the following formula:



wherein,

m is zero or the positive integer one to five;

n is the positive integer two to six;

each of R^1, R^2, R^6, R^7 and R^{10} is hydrogen or lower alkyl;

R^8 is hydrogen, and

each of R^3, R^4 and R^5 is lower alkyl.

3,888,894

TERTIARY DIAMIDES

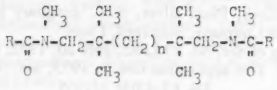
Robert M. Thompson, Chalfonte, Del., assignor to Sun Research and Development Co., Philadelphia, Pa.

Filed Oct. 2, 1972, Ser. No. 293,979

Int. Cl. C07c *103/00*

U.S. Cl. 260—404.5 **3 Claims**

1.



wherein

$n = 0$–10

$R = -(CH_2)_m-CH_3$

wherein

$m = 4$–12.

3,888,895

PRODUCTION OF TITANIUM ACETYLACETONATE BIS(DIMETHYLAMINE)

Andrew J. Manning, Randolph Township, and Michael J. Ram, West Orange, both of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Feb. 13, 1974, Ser. No. 442,039

Int. Cl. C07f *7/28*

U.S. Cl. 260—429.5 **9 Claims**

1. Titanium acetylacetonate bis(dimethylamine).

2. A process for the production of titanium acetylacetonate bis(dimethylamine) comprising:

a. providing a solution of titanium acetylacetonate in isopropanol,

b. heating said solution in the presence of N,N-dimethylacetamide until titanium acetylacetonate bis(dimethylamine) is formed, and

c. recovering the titanium acetylacetonate bis(dimethylamine) product.

3,888,896

METHANOL PRODUCTION

Ramon L. Espino, New York, and Thomas S. Pletzke, Cambria Heights, both of N.Y., assignors to Chem Systems Inc., New York, N.Y.

Filed May 29, 1973, Ser. No. 364,347

Int. Cl. C07c *31/06*

U.S. Cl. 260—449.5 **4 Claims**

1. In a process for the catalytic preparation of methanol from carbon monoxide and hydrogen in the presence of a methanol-forming catalyst comprising zinc and chromium, the improvement of saturating a polyalkylbenzene selected from the group consisting of pseudocumene, xylene, durene, isodurene, mesitylene and diethyl benzene. With carbon monoxide and at least 2 moles of hydrogen per mole of carbon monoxide and contacting the saturated polyalkylbenzene at a temperature of from 200° to 400° C., and a pressure of from 200 to 10,000 psia.

3,888,897

CYANO-AND CYANOMETHYL-BENZENSULFONAMIDES

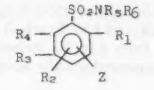
Elmore Louis Martin, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 243,404, April 12, 1972, abandoned. This application Feb. 21, 1973, Ser. No. 334,411

Int. Cl. C07c *121/52*

U.S. Cl. 260—465 E **3 Claims**

1. A compound of the formula



(1)

wherein

Z is cyano, or cyanomethyl;

R_1, R_2, R_3, and R_4 are the same or different and are independently selected from the group consisting of hydrogen, alkyl of 2 to 7 carbon atoms and halogen provided that:

a. two of R_1, R_2, R_3, and R_4 are alkyl of 2 to 7 carbon atoms;

b. no alkyl groups are ortho to each other;

c. at least one of R_1, R_2, R_3, and R_4 is alkyl of 3 to 7 carbon atoms;

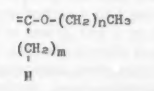
d. two of R_1, R_2, R_3, and R_4 are independently hydrogen or halogen;

e. the total carbon content of R_1, R_2, R_3, and R_4 is not greater than 9 carbon atoms; and

f. each alkyl group has from 2 to 3 carbon atoms in a straight chain from the point of attachment to the aromatic ring; and

R_5 is hydrogen, alkyl of 1 to 3 carbon atoms, allyl or propynyl;

R_6 is hydrogen, alkyl of 1 to 3 carbon atoms, allyl, propynyl, lithium, sodium, potassium, calcium or acyl or 1 to 3 carbon atoms; and R_5 and R_6 together can form



where

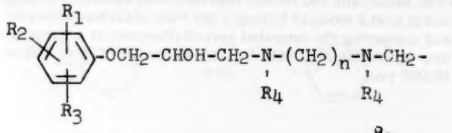
m is 0 or 1 and *n* is 0 or 1.

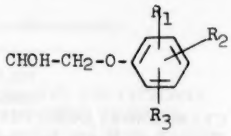
3,888,898
N,N'-BIS-(3-PHENOXY-2-HYDROXY-PROPYL)-ALKENEDIAMINES AND SALTS THEREOF

Herbert Koppe; Helmut Stahle; Werner Kummer; Gojko Muacevic, and Werner Traunecker, all of Ingelheim am Rhein, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

Filed Feb. 27, 1973, Ser. No. 336,269
Claims priority, application Germany, Mar. 6, 1972, 2210620; Dec. 11, 1972, 2260444
Int. Cl. C07c *121/78*
U.S. Cl. 260—465 E 4 Claims

1. A compound of the formula





wherein

R_1 is $-(CH_2)_x-CN$, where x is 0,1,2 or 3,

R_2 is hydrogen, halogen, alkyl of 1 to 5 carbon atoms, alkoxy of 1 to 5 carbon atoms, alkenyl of 2 to 5 carbon atoms or alkenyloxy of 2 to 5 carbon atoms;

R_3 is hydrogen, halogen, alkyl of 1 to 5 carbon atoms or alkoxy of 1 to 5 carbon atoms;

R_2 and R_3, together with each other and the carbon atoms to which they are attached, form a saturated or unsaturated carbocyclic ring of up to 6 carbon atoms;

R_4 is hydrogen, alkyl of 1 to 5 carbon atoms or aralkyl; and

n is an integer from 1 to 10, inclusive;

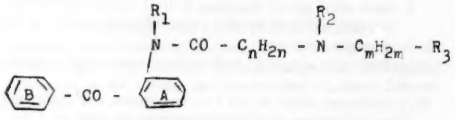
or a non-toxic, pharamcologically acceptable acid addition salt thereof.

3,888,899
CYANOALKYLAMINO-AMIDO BENZOPHENONES

Heinz Gunter Greve, and Klaus Resag, both of Frankfurt am Main-Fechenheim, Germany, assignors to Cassella Farbwerke Mainkur Akt., Frankfurt am Main, Germany

Filed May 8, 1973, Ser. No. 358,455
Claims priority, application Luxembourg, May 12, 1972, 65340
Int. Cl. C07c *121/78*
U.S. Cl. 260—465 D 8 Claims

1. Benzophenone derivatives having the structural formula



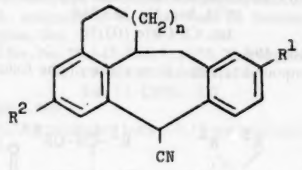
and the acid addition salts thereof, wherein R_1 and R_2 are substituents selected from the group consisting of hydrogen, allyl and alkyl having 1 to 4 carbon atoms; R_3 is CN; n is an integer selected from 1 and 2; and m is an integer selected from 1, 2 and 3, and wherein the ring A is selected from the group consisting of phenylene, halogenphenylene, nitrophenylene, trifluoromethylphenylene, methylphenylene, methoxyphenylene and methylmercaptophenylene; the ring B is selected from the group consisting of phenyl, fluorophenyl and chlorophenyl.

3,888,900
7-CYANO-HEXAHYDRO PLEIADENES

William J. Houlihan, Baden, Austria, and Jeffrey Nadelson, Parsippany, N.J., assignors to Sandoz, Inc., E. Hanover, N.J.

Division of Ser. No. 172,587, Aug. 17, 1971, Pat. No. 3,763,233. This application June 12, 1973, Ser. No. 369,208
Int. Cl. C07c *121/64*
U.S. Cl. 260—465 R 2 Claims

1. A compound of the formula



wherein

n represents 1or 2;

R^1 represents H, halo having an atomic weight of 19–36, or trifluoromethyl; and

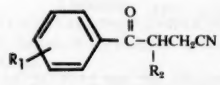
R^2 represents H, Halo having an atomic weight of 19–36, trifluoromethyl, straight chain lower alkyl, or straight chain lower alkoxy.

3,888,901
PROCESS OF PREPARING 3-ALKYL-3-(BENZOYL)PROPIONITRILES

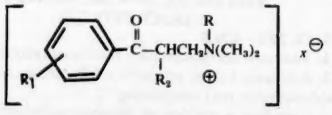
George Rodger Allen, Jr., Old Tappan, N.J., and Francis Joseph McEvoy, Pearl River, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 273,585, July 20, 1972, Pat. No. 3,824,271. This application Dec. 6, 1973, Ser. No. 422,395
Int. Cl. C07c *121/66*
U.S. Cl. 260—465 R 7 Claims

1. The process of preparing compounds of the formula:



wherein R_1 is selected from the group consisting of halogen, nitro and lower alkanoylamino and R_2 is selected from the group consisting of methyl, etheyl and n-propyl which comprises contacting a quaternary salt of the formula:



wherein R_1 and R_2 are as hereinabove defined, R is lower alkyl, and X^- is selected from the group consisting of chloride, bromide, iodide, sulfate and lower alkyl sulfate with an alkali metal cyanide or an alkaline earth metal cyanide in an inert solvent at ambient temperatures for a period of time sufficient for a substantial degree of displacement to occur.

3,888,902
CYANO-INDENYL ACETIC ACIDS

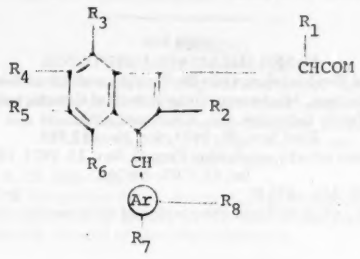
Tsung-Ying Shen, Westfield, N.J.; Richard B. Greenwald, Framingham, Mass.; Howard Jones, Holmdel, N.J.; Bruce O. Linn, Somerville, N.J., and Bruce E. Witzel, Westfield, N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 301,914, Oct. 30, 1972, abandoned, which is a division of Ser. No. 187,197, Oct. 6, 1971, Pat. No. 3,725,548, which is a division of Ser. No. 33,891, May 1, 1970, Pat. No. 3,654,349, which is a continuation-in-part of Ser. No. 848,736, Aug. 8, 1969, abandoned. This application June 11, 1974, Ser. No. 478,548

Int. Cl. C07c *121/64*

U.S. Cl. 260—465 D **6 Claims**

1. A compound of the formula:



wherein:

Ar is phenyl;

R_1 is hydrogen, C_{1-5} loweralkyl or halogenated C_{1-5} loweralkyl;

R_2 is hydrogen or C_{1-5} loweralkyl;

R_3, R_4, R_5 and R_6 are each hydrogen, C_{1-5} loweralkyl, acyloxy, C_{1-5} loweralkoxy, nitro, amino, acylamino, C_{1-5} loweralkylamino, di-C_{1-5} loweralkylamino, di-C_{1-5} loweralkylaminoalkyl, sulfamyl, C_{1-5} loweralkylthio, mercapto, halogen, hydroxy, hydroxy C_{1-5} loweralkyl, C_{1-5} loweralkylsulfonyl, cyano, carboxyl, carb C_{1-5} loweralkoxy, carbamido, halogeno C_{1-5} loweralkyl, cycloalkyl, cycloalkoxy, alkynyl, alkenyl or aroyl at least one of R_3-R_6 being cyano;

R_7 may be C_{1-5} loweralkylsulfinyl or C_{1-5} loweralkylsulfonyl; R_8 may be hydrogen, halogen, hydroxy, C_{1-5} loweralkoxy or halo C_{1-5} loweralkyl; and

M may be hydroxy, C_{1-5} loweralkoxy and the group OMe in which Me is a cation.

3,888,903
PHENYL-N-(1-ALKENYL)-N-METHYLCARBAMATES

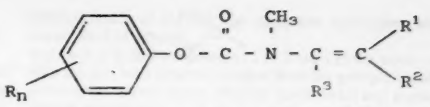
John Paul Chupp, Kirkwood, Mo., assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 20,044, March 16, 1970, Pat. No. 3,764,695. This application June 21, 1973, Ser. No. 372,434

Int. Cl. C07c *125/06*

U.S. Cl. 260—468 E **10 Claims**

1. A compound of the formula



wherein R is alkyl or alkylamino of a maximum of 6 carbon atoms,

R^1, R^2 and R^3 are hydrogen or alkyl of a maximum of 4 carbon atoms,

R^2 and R^3 can together form an alkylene group of 3 through 6 carbon atoms,

and *n* is an integer from 0 through 2.

3,888,904
PROCESS FOR EXTRACTING PROSTAGLANDINS

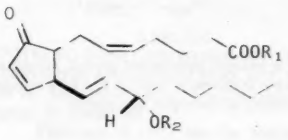
William P. Schneider, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 159,526, July 2, 1971, abandoned, which is a continuation-in-part of Ser. No. 71,431, Sept. 11, 1970, abandoned. This application Jan. 9, 1974, Ser. No. 431,835

Int. Cl. C07c *51/48, 67/06*

U.S. Cl. 260—468 D **24 Claims**

1. A process for producing a compound of the formula:



wherein R_1 and R_2 are both hydrogen, or wherein R_1 is methyl and R_2 is hydrogen or acetyl, which comprises the steps (1) extracting colonies or colony pieces of the marine invertebrate *Plexaura homomalla* (Esper), 1792, forma S with a liquid halogenated hydrocarbon having a boiling point below about 100° C., and (2) separating said compound from the resulting extract.

3,888,905
PROSTAGLANDIN INTERMEDIATES AND OPTICALLY ACTIVE ISOMERS THEREOF

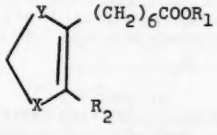
Masateru Miyano, Morton Grove, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Continuation-in-part of Ser. No. 799,965, Feb. 17, 1969, abandoned. This application Oct. 7, 1971, Ser. No. 187,508

Int. Cl. C07c *65/02, 65/20, 69/76*

U.S. Cl. 260—471 A **20 Claims**

1. A compound of the formula



wherein R_1 is hydrogen or a lower alkyl radical containing 1–7 carbon atoms inclusive, R_2 is a, α,β-dihydroxyphenethyl or phenethyl radical, Y is a carbonyl, hydroxyiminomethylene or semicarbazonomethylene radical and X is a carbonyl radical or a radical of the formula

with Z being hydroxy, (−)-menthoxyacetoxy, (−)-O-methylmandeloxy, (+)-O-methylmandeloxy, (lower alkanoyl-)oxy or chloro(lower alkanoyl)oxy and the wavy lines represent the α and β stereochemical configurations or the racemic mixture.

7. As in claim 6, the compound which is 3-hydroxy-5-hydroxyimino-2-styrylcyclopent-1-eneheptanoic acid.

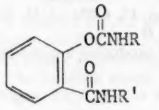
3,888,906

ORTHO-CARBAMYLOXY-BENZAMIDE BACTERICIDES

Llewellyn W. Fancher, Orinda, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Filed May 2, 1974, Ser. No. 466,107
Int. Cl. C07c *125/06*
U.S. Cl. 260—472 **3 Claims**

1. A compound having the formula



wherein R is halogen substituted phenyl, substituted at least one of which is in the meta position and R′ is selected from the group consisting of hydrogen and phenyl.

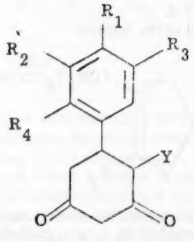
3,888,907

LOWER ALKYL ESTERS OF 2-(3,4-DIMETHOXYPHENYL)-4,6-DIOXOCYCLOHEXANE CARBOXYLIC ACID

Arnold Brossi, Verona, and Benjamin Pecherer, Montclair, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 884,327, Dec. 11, 1969, Pat. No. 3,751,487, which is a continuation-in-part of Ser. No. 559,383, June 22, 1966, abandoned. This application Mar. 23, 1973, Ser. No. 344,382
Int. Cl. C07c *69/76*
U.S. Cl. 260—473 R **2 Claims**

1. A compound of the formula



wherein R_1 and R_2 are each lower alkoxy; R_3 and R_4 are each hydrogen; and Y is a carboxylic acid lower alkyl ester group.

3,888,908

POLYESTER POLYOLS

James M. Cross, New Martinsville, W. Va.; George A. Hudson, Venetia, and Joseph C. Hixenbaugh, Aliquippa, both of Pa., assignors to Mobay Chemical Corporation, Pittsburgh, Pa.

Filed Mar. 6, 1973, Ser. No. 338,470
Int. Cl. C07c *69/76, 69/80*
U.S. Cl. 260—475 P **2 Claims**

1. A polyester polyol prepared by a process comprising reacting a dicarboxylic acid other than a dimer acid, a dicarboxylic acid anhydride, a dihydric alcohol and a trihydric alcohol such that the molar ratio of dihydric alcohol to trihydric alcohol is from about 2.5 to 1 to about 6 to 1, said polyester containing from about 0.7 to about 1.3 branch points per 1000 molecular weight units, having a molecular weight from about 3,250 to about 3,750 and having a hydroxyl number of from about 72 to about 78.

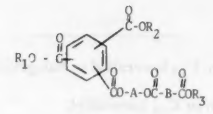
3,888,909

MIXED MELLITATE COMPOUNDS

Roland Hendrickriem, Oakville, Ontario, and Alfred Johannes Dieterman, Mississauga, Ontario, both of Canada, assignors to Emery Industries, Inc., Cincinnati, Ohio

Filed Nov. 20, 1973, Ser. No. 417,585
Claims priority, application Canada, Nov. 23, 1972, 157257
Int. Cl. C07c *69/76*
U.S. Cl. 260—475 P **6 Claims**

1. A mixed mellitate composition of the formula



wherein R_1, R_2 and R_3 are saturated hydrocarbon radicals containing from 1 to 22 carbon atoms, A is a saturated bivalent hydrocarbon radical containing from 2 to 8 carbon atoms and B is a saturated bivalent hydrocarbon radical containing 2 to 22 carbon atoms.

3,888,910

SURFACTIVE MATERIAL AND ITS PREPARATION

Fred Smeets, Tienen, Belgium, assignor to La Citrique Belge, N.V., Tiene, Belgium

Continuation of Ser. No. 742,540, July 5, 1968, abandoned, which is a continuation-in-part of Ser. No. 563,816, July 8, 1966, Pat. No. 3,586,715. This application Sept. 14, 1971, Ser. No. 180,450
Claims priority, application United Kingdom, July 19, 1965, 30640/65; July 5, 1967, 31014/67; Oct. 19, 1967, 47676/67
Int. Cl. C07c *143/54*
U.S. Cl. 260—479 R **11 Claims**

1. A biodegradable surface-active compound prepared by the process comprising the steps of:

a. forming an unsaturated polycarboxylic acid material by pyrolyzing an alkaline earth citrate at a temperature between 250° to 400° C. for a period of time until an increase in titratable alkalinity of the reaction mixture is obtained and until not more than 32% by weight of the alkaline earth citrate remains in the reaction mixture, and hydrolyzing the material thus obtained to an acid;

b. forming an ester from the said acid material by reacting at least one carboxylic acid group thereof with a mono- or polyhydroxy-containing non-ionic surfactant selected from at least one C_1 – C_{24} monohydric or polyhydric aliphatic alcohol and a polyalkoxylated alkyl phenol; and

c. sulphonating the double bonds of the unsaturated polycarboxylic acid either before or after esterification to form sodium sulphonate groups thereon.

3,888,911
PROCESS FOR THE PREPARATION OF ETHYLENE POLYMER TELOMER WAXES

John E. Dench, Dover; Harry Knutson, Brookside, and Manfred K. Seven, Long Valley, all of N.J., assignors to Allied Chemical Corporation, New York, N.Y.

Filed Mar. 2, 1971, Ser. No. 120,356
Int. Cl. C07c *69/66*
U.S. Cl. 260—484 R **19 Claims**

18. In the process for preparing wax telomer polymers of ethylene having a molecular weight of 1,000 to 5,000 by vapor phase reaction of a feed stream containing ethylene, a telogen and a free radical initiator, the improvement which comprises utilizing as initiator a member of the group consisting of t-butylperacetate, t-butylperoctoate, 1-cyano-1(t-butylazo)cyclohexane, 2-(t-butylazo)isobutyronitrile and 2-t-butylazo-2-phenylpropane.

3,888,912
PROCESS FOR MAKING BETA-ACRYLOYLOXYPROPANOIC ACID

Mario D. Burguette, North St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 20, 1973, Ser. No. 389,945
Int. Cl. C07c *69/54*
U.S. Cl. 260—486 R **6 Claims**

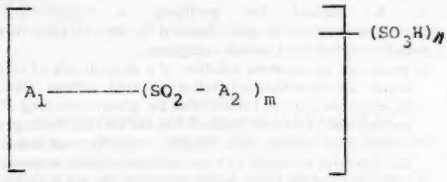
1. The process for producing β-acryloyloxypropanoic acid which comprises heating acrylic acid in the presence of a catalytic amount of aluminum trichloride.

3,888,913
NOVEL CYCLIC SULPHONES AND DERIVATIVES THEREOF

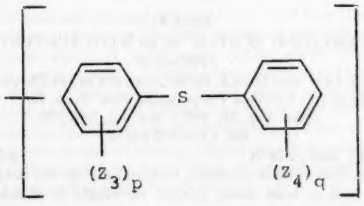
Hans-Peter Baumann, Baselland, and Robert-Christian Keller, Basel, both of Switzerland, assignors to Sandoz, Inc., Basel, Switzerland

Division of Ser. No. 620,231, March 3, 1967, Pat. No. 3,538,151. This application June 29, 1970, Ser. No. 60,169
Int. Cl. C07c *143/24*
U.S. Cl. 260—501.19 **7 Claims**

1. A compound which is a member of the group consisting of (1) sulphones of the formula



wherein
m represents 1 or 2,
n represents 1, 2, or 3,
A_1 and A_2 are identical with or different from one another and each represents a radical of the formula



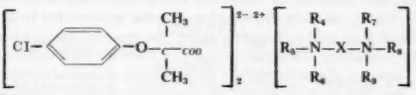
wherein each of Z_3 and Z_4 represents hydrogen, halogen, lower alkyl or phenyl,
and each of p and q represents 1 or 2 and (2) the water soluble salts thereof with cations selected from the group-consisting of ammonium, alkali metal, alkaline earth metal and ammonium groups containing 1 to 3 alkyl or hydroxy-alkyl groups of 1 to 3 carbon atoms and hexamethylene tetramine.

3,888,914
NOVEL CHEMICAL COMPOUNDS, PROCESSES FOR MAKING THEM AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Andre Foldes, and Geza Delmar, both of Montreal, Quebec, Canada, assignors to Delmar Chemicals, Limited, Ville La-Salle, Quebec, Canada

Continuation of Ser. No. 9,417, Feb. 6, 1970, abandoned. This application Oct. 10, 1972, Ser. No. 296,074
Int. Cl. C07c *63/00*
U.S. Cl. 260—501.16 **2 Claims**

1. An amine salt of p-chlorophenoxyisobutyric acid which has the formula:



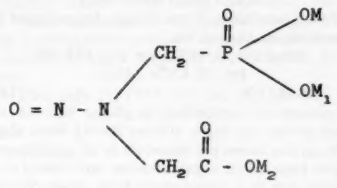
wherein X is a straight chain lower alkylene, and R_4, R_5, R_6, R_7, R_8 and R_9 are each hydrogen.

3,888,915
N-NITROSO-N-PHOSPHONOMETHYL GLYCINE COMPOUNDS AND HERBICIDAL USE THEREOF

Gerhard H. Alt, Creve Coeur, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Sept. 4, 1973, Ser. No. 394,019
Int. Cl. C07d *105/22*
U.S. Cl. 260—501.21 **4 Claims**

1. A compound of the formula



wherein M, M_1 and M_2 are each individually hydrogen or a saltforming cation selected from the class consisting of alkali metals, alkaline earth metals, ammonium, mono-, di-, and trialkyl ammonium each containing 1 to 6 carbon atoms, cycloalkyl ammonium containing 3 to 6 carbon atoms, aniline and substituted anilines wherein the substituents are halo, nitro, methoxy, methyl or ethyl groups, with the proviso that at least one of M, M_1 and M_2 is hydrogen when the others are other than an alkali metal or an alkaline earth metal.

3,888,916
AMANTADINE SALT OF 16,16-DIMETHYL-PGE$_2$

Anthony A. Sinkula, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Aug. 1, 1974, Ser. No. 493,544
Int. Cl. C07c *97/00*
U.S. Cl. 260—501.1 **2 Claims**

1. The amantadine salt of 16,16-dimethyl-PGE$_2$.

2. Free-flowing crystals of the amantadine salt of 16,16-dimethyl-PGE_2.

3,888,917

ORGANIC SULFONATE EXTRACTION PROCESS

Denton C. Fentress, Littleton, and Kent W. Robinson, Englewood, both of Colo., assignors to Marathon Oil Company, Findlay, Ohio

Continuation-in-part of Ser. No. 763,185, Sept. 27, 1968, abandoned. This application May 6, 1971, Ser. No. 141,032

Int. Cl. C07c *139/00*

U.S. Cl. 260—504 R 15 Claims

1. A process of recovering alkane sulfonates containing about 6 to about 30 carbon atoms per molecule from an aqueous reaction mixture comprised of said alkane, alkanols containing 1-6 carbon atoms sulfonates, water, unsaturaged hydrocarbons containing about 6 to about 30 carbon atoms, sulfonating agents selected from the group consisting of alkali metal and ammonium bisulfites, pyrosulfites and metabisulfites, and by-products from sulfonating the unsaturated hydrocarbons with said sulfonating agent, the process comprising:

1) contacting the aqueous reaction mixture with sufficient amount of a substantially watersoluble alkanone containing 3-6 carbon atoms to cause the organic sulfonate within the mixture to precipitate,

2) permitting said alkane sulfonate within the resulting mixture to precipitate, and then

3) separating said alkane sulfonate from the aqueous mixture.

3,888,918

PROCESS FOR REACTING A SULTONE WITH A NON-BASIC ALKALI METAL, ALKALINE EARTH METAL OR AMMONIUM HALIDE SALT IN AN ANHYDROUS SYSTEM

Gerhard O. Kuehnhanss, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Dec. 7, 1972, Ser. No. 312,948

Int. Cl. C07c *143/16*

U.S. Cl. 260—513 R 18 Claims

1. A process for producing an alkene sulfonic acid salt which comprises reacting a sultone having from about 6 to about 36 carbon atoms per molecule in an anhydrous system with a non-basic alkali metal, alkaline earth metal or ammonium halide salt at a temperature from about 50° to about 250°C producing a volatile hydrogen halide and alkene sulfonic acid salt, while removing said volatile hydrogen halide to enhance conversion of the sultone to the alkene sulfonic acid salt.

3,888,919

11,15 DIMETHYL PGE_1 AND $PGF_{1\alpha}$

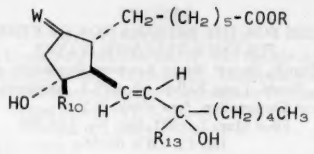
John E. Pike, and William P. Schneider, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 123,370, March 11, 1971, abandoned, which is a continuation-in-part of Ser. No. 648,992, June 26, 1967, abandoned. This application Dec. 8, 1972, Ser. No. 313,368

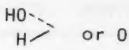
Int. Cl. C07c *61/32, 61/36, 69/74*

U.S. Cl. 260—514 D 9 Claims

1. An optically active compound of the formula:



or a racemic compound of that formula and the mirror image thereof, wherein R is hydrogen or a hydrocarbyl group containing from 1 to 12 carbon atoms, inclusive, wherein W is



and wherein R_{10} and R_{13} are both alkyl of one to 4 carbon atoms, inclusive.

3,888,920

ARYL SUBSTITUTED-4-ALKENOIC ACIDS

Marcel K. Eberle, Madison, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Filed Aug. 6, 1973, Ser. No. 386,085

Int. Cl. C07c *63/30*

U.S. Cl. 260—515 R 2 Claims

1. The compound which is 2,2,3-triphenyl-4-pentenoic acid.

2. The compound which is 2-(p-chlorophenyl)-3-phenyl-4-pentenoic acid.

3,888,921

METHOD FOR PURIFYING 2,6-NAPHTHALENEDICARBOXYLIC ACID

Kiyoshi Yamamoto, and Gentaro Yamashita, both of Iwakuni, Japan, assignors to Teijin Ltd., Osaka, Japan

Filed May 31, 1973, Ser. No. 365,702

Int. Cl. C02c *63/68*

U.S. Cl. 260—525 11 Claims

1. A method for purifying a crude 2,6-naphthalenedicarboxylic acid obtained by the oxidation of a 2,6-dialkylnaphthalene, which comprises

a. preparing an aqueous solution of a dialkali salt of said crude 2,6-naphthalenedicarboxylic acid, whose alkali moieties are derived from one of the group consisting of: sodium and potassium hydroxides, carbonates, hydrogen carbonates, sulfites, and bisulfites; aqueous ammonia; and aqueous solutions of water-soluble organic amines,

b. precipitating 40 to 97 mol percent of the dialkali 2,6-naphthalenedicarboxylate dissolved in said aqueous solution substantially as a monoalkali salt of the 2,6-naphthalenedicarboxylic acid while maintaining the pH of said aqueous solution at a value not lower than 6.3, and separating the precipitate, and

c. converting the separated precipitate to a 2,6-naphthalenedicarboxylic acid.

3,888,922

STABILIZING ACRYLIC ACID WITH ALKYLATED PHENOLS

Leon B. Levy, and Gene J. Fisher, both of Corpus Christi, Tex., assignors to Celanese Corporation, New York, N.Y.

Filed Apr. 30, 1973, Ser. No. 355,390

Int. Cl. C07f *69/54*

U.S. Cl. 260—526 N 6 Claims

1. A composition consisting essentially of acrylic acid stabilized with at least about 0.001% its weight of at least one

stabilizing branched lower alkyl-substituted phenol which is a member of the group consisting of tri-lower alkyl phenols and lower alkyl-lower alkoxy phenols.

3,888,923

PROCESS OF MAKING PENICILLAMINE

Friedrich Asinger, Aachen; Karl-Heinz Gluzek, Orsoy, and Heribert Offermanns, Grossauheim, all of Germany, assignors to Deutsche Gold-und Silber-Scheideanstalt vormals Roessler, Frankfurt am Main, Germany

Filed Aug. 23, 1972, Ser. No. 283,233

Claims priority, application Germany, Aug. 24, 1971, 2142336

Int. Cl. C07c *101/20, 99/00*

U.S. Cl. 260—534 S 18 Claims

17. A process as defined in claim 1 in which the 2-isopropyl-5,5-dimethylthiazolidine is 2-isopropyl-5,5-dimethylthiazolidine-4-carboxylic acid hydrochloride.

3,888,924

BIS(DIALKYLAMINO)SULFUR DIFLUORIDES

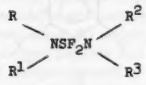
William Joseph Middleton, Chadds Ford, Pa., assignor to E. I. Du Pont De Nemours & Company, Wilmington, Del.

Filed Mar. 23, 1973, Ser. No. 344,168

Int. Cl. C07d *29/34, 27/02*; C07c *145/00*

U.S. Cl. 260—543 F 4 Claims

1. A compound of the formula



wherein R, R^1, R^2 and R^3, alike or different, are each a primary alkyl group of 1 to 6 carbons, or when R and R^1 taken together, and R^2 and R^3 taken together, are $-(CH_2)_4-$ or $-(CH_2)_5-$.

3,888,925

SUBSTITUTED DICHLOROSULFENAMIDES

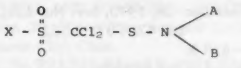
Wendell Gary Phillips, Olivette, Mo., assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 159,034, July 1, 1971, Pat. No. 3,766,172. This application Apr. 30, 1973, Ser. No. 355,836

Int. Cl. C07c *145/00*

U.S. Cl. 260—551 S 6 Claims

1. A substituted dichlorosulfenamide of the formula



wherein X is phenyl, phenyl substituted by 1 to 3 halo, phenyl substituted by 1 to 3 trihalomethyl, or phenyl substituted by 1 to 3 lower alphyl, A is hydrogen, methyl alkenyl having from 3 to 5 carbon atoms, inclusive, branched alkynyl having from 4 to 5 carbon atoms, inclusive, lower alkyl, lower alkoxyalkyl, and B is methyl alkenyl having from 3 to 5 carbon atoms, inclusive, branched alkynyl having from 4 to 5 carbon atoms, inclusive, phenyl, phenyl substituted by 1 to 3 halo, trihalomethyl, or lower alkyl, or phenyl substituted by 1 to 3 lower alkoxyalkyl.

3,888,926

METHOD OF PREPARING INDOPHENOLS AND OXICHROMIC COMPOUNDS

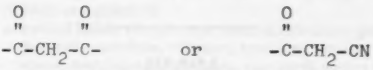
Daniel Francis Reardon, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 206,927, Dec. 10, 1971, abandoned. This application Aug. 30, 1973, Ser. No. 393,242

Int. Cl. C07c *91/44*

U.S. Cl. 260—559 A 8 Claims

1. A process comprising reacting 1) an open-chain ketomethylene photographic coupler compound comprising the group:



which is α-brominated on the methylene carbon atom shown in said formulae with 2) an aromatic primary amine which is a 2,6-dihalo-4-aminophenol, said reaction being carried out a) in a basic medium containing a tertiary amine acid acceptor which is a weak base and b) in the presence of a polar solvent.

3,888,927

ANTI-INFLAMMATORY N,N'-DISUBSTITUTED AMIDINES

Hiroshi Hamakawa; Sadami Kobari; Takeshi Shimizu; Kentaro Fujimoto; Kazuo Hayano, and Tetsuo Matsuda, all of Shizuoka, Japan, assignors to Toyo Jozo Kabushiki Kaisha, Shizuoka, Japan

Filed June 7, 1974, Ser. No. 477,347

Claims priority, application Japan, June 7, 1973, 48-64555; June 7, 1973, 48-64556

Int. Cl. C07c *123/00*

U.S. Cl. 260—564 R 7 Claims

1. N-cyclohexyl-N'-3,4-dichlorophenyl-benzamidine hydrochloride.

3,888,928

1,4-BIS(DIALLYLAMINOMETHYL)-BENZENE

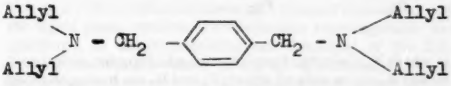
Donald Willis, Blackburn; Hendrik Adriaan Jacobus Battaerd, North Clayton; Gunter Anton Lang, Tullamarine, and Donald Eric Weiss, Blackburn, all of Australia, assignors to ICI Australia Limited, Melbourne and Commonwealth Scientific and Industrial Research Organization, Campbell, both of, Australia

Filed July 31, 1972, Ser. No. 276,528

Int. Cl. C07c *87/28*

U.S. Cl. 260—570.9 1 Claim

1. The monomer:



3,888,929

PROCESS FOR DEHALOGENATION OF POLYHALOGENATED AROMATIC COMPOUNDS

Georges Rivier, Bron, France, assignor to Rhone-Progil, Paris, France

Filed Nov. 21, 1972, Ser. No. 308,459

Claims priority, application France, Nov. 30, 1971, 71.43773

Int. Cl. C07c *87/60*

U.S. Cl. 260—578 9 Claims

1. A process for the preparation of chlorinated anilines having at least a chlorine atom in the meta position to the

amino group, in which tri- to pentachloranilines are dechlorinated, said process consisting essentially of:

reacting in a dechlorination zone, said tri- to pentachloroanilines having at least a chlorine atom in the meta position and at least a chlorine atom in another position, in the vapor phase with hydrogen, in the presence of an hydrogenation catalyst selected from the group consisting of the chlorides, oxides, nitrates, sulfates and chromites of copper or silver, to provide by dechlorination said chlorinated anilines having at least a chlorine atom in the meta position;

and recovering said chlorinated anilines having at least a chlorine atom in the meta position.

3,888,930

NEW TERTIARY PHOSPHINE OXIDES AND PROCESS FOR THEIR PREPARATION

Hans-Jerg Kleiner, Bad Soden, Taunus; Walter Dürsch, Schneidhain, Taunus; Gerhard Stahler, Frankfurt am Main, and Werner Racky, Wiesbaden, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

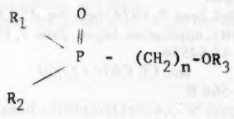
Filed Nov. 28, 1973, Ser. No. 419,549

Claims priority, application Germany, Nov. 30, 1972, 2258662

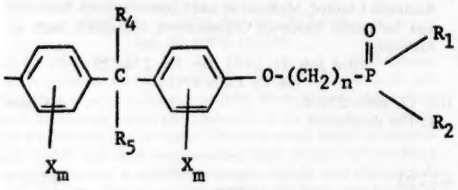
Int. Cl. C07f *9/28*

U.S. Cl. 260—606.5 P **8 Claims**

1. A tertiary phosphine oxide of the general formula



wherein R_1 and R_2 represent alkyl groups of 1 to 6 carbon atoms and may be the same or different and R_3 represents a phenyl group which may be substituted by 1 to 5 chlorine and/or bromine atoms or the group having the general formula



in which X is selected from chlorine and bromine, *m* is 1 to 4, R_1 and R_2 are as defined above, R_4 and R_5 are hydrogen atoms or alkyl groups of 1 to 6 carbon atoms, and *n* is 1 to 3.

3,888,931

PREPARATION OF ALKYL VINYL ETHERS

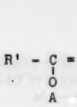
Charles M. Starks, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Continuation-in-part of Ser. No. 97,301, Dec. 11, 1970, abandoned, which is a continuation-in-part of Ser. No. 807,092, March 13, 1969, abandoned. This application Aug. 10, 1972, Ser. No. 279,571

Int. Cl. C07c *41/00*

U.S. Cl. 260—611 A **8 Claims**

1. A process for forming vinyl ethers of the formula



wherein

R′ is alkyl, alkenyl, aryl or an alkaryl radical; and

A is an aliphatic C_1–C_{20} hydrocarbon radical; which comprises reacting (1) a halogen-substituted hydrocarbon having the general formula

$R' - CH = CHX$

wherein R′ is as defined above, and X is halogen, with (2) a primary or secondary alcohol represented by AOH wherein A is as defined, in the presence of a base stronger than ammonium hydroxide at autogeneous pressures and temperatures in the range of 150°C to 400°C.

3,888,932

HERBICIDAL 4-TRIFLUOROMETHYL-4-NITRODIPHENYL ETHERS

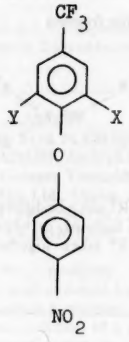
Horst O. Bayer, Levittown; Colin Swithenbank, Perkasie, and Roy Y. Yih, Doylestown, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Mar. 14, 1972, Ser. No. 234,656

Int. Cl. C07c *43/20*

U.S. Cl. 260—612 R **5 Claims**

1. A compound of the formula



wherein

X is a halogen atom and

wherein Y is a hydrogen or a halogen atom

3,888,933

4-HYDROXYETHYL-BIPHENYLYL-BUTADIENOLS

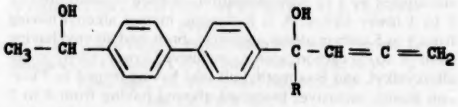
Paul L. Anderson, Dover, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Filed Dec. 28, 1973, Ser. No. 429,388

Int. Cl. C07c *33/02*

U.S. Cl. 260—618 R **2 Claims**

1. A compound of the formula



wherein

R is a hydrogen atom, methyl or ethyl.

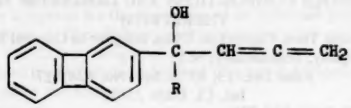
3,888,934

BIPHENYLENE-SUBSTITUTED-BUTADIENOLS

Paul L. Anderson, Dover, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Filed Dec. 28, 1973, Ser. No. 429,389
Int. Cl. C07c 33/02
U.S. Cl. 260—618 F 2 Claims

1. A compound of the formula:



wherein
R is a hydrogen atom, methyl or ethyl.

3,888,935

PROCESS FOR PRODUCING ALKYL FLUORIDES FROM MONO-OLEFINS

Jay E. Sobel, Highland Park, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 190,020, Oct. 18, 1971, abandoned. This application June 4, 1973, Ser. No. 366,832
Int. Cl. C07c 17/08, 19/08
U.S. Cl. 260—653.6 6 Claims

1. A process for producng an alkyl fluoride which comprises contacting a hydrocarbon reactant consisting essentially of at least one C_3–C_5 mono-olefin at fluorination conditions with a liquid solution of from about 40 weight percent to about 65 weight percent of hydrogen fluoride and from about 60 weight percent to about 35 weight percent of a hydrogen fluoride-soluble hydrocarbon having a molecular weight between about 150 and 600 and selected from the group consisting of polymers of olefins of from 3 to 5 carbon atoms, polycyclic aromatic hydrocarbons and terpene polymers, said fluorination conditions including a temperature of from about 0°F. to about 150°F., a pressure of from about 1 to about 40 atmospheres, a volume ratio of said mono-olefin to said solution of about 1:100 to about 5:1, and a contact time of from about 0.1 to about 60 minutes, and recovering said alkyl fluoride from the resulting mixture.

3,888,936

REMOVAL OF FREE RADICAL INHIBITORS TO PROMOTE SYNTHESIS OF ALPHA, OMEGA-DICHLOROALKANE TELOMERS FROM ETHYLENE AND SULFURYL CHLORIDE

Joseph A. Hudson, Jr., Waco, Tex., assignor to Continental Oil Company, Ponca City, Okla.

Division of Ser. No. 233,321, March 9, 1972. This application Jan. 19, 1973, Ser. No. 324,901
Int. Cl. C07c 17/02
U.S. Cl. 260—659 R 1 Claim

1. In a process for the telomerization of ethylene and sulfuryl chloride to form alpha,omega-dichloroalkanes wherein the telomerization is conducted at a temperature of 100°–300°C and at a pressure of 100 to 30,000 psig, the improvement comprising conducting the telomerization in a reaction environment which is previously rendered free from oxygen and initiating it thermally.

3,888,937

CATALYTIC HYDROGENATION WITH A MIXTURE OF METAL HALIDE AND ANHYDROUS PROTONIC ACID

Michael Siskin, Maplewood, and Jos P. Wristers, New Brunswick, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed June 12, 1973, Ser. No. 369,304
Int. Cl. C07c 5/10
U.S. Cl. 260—667 13 Claims

1. A process for hydrogenating a feed comprising organic compounds containing one or more ethylenic linkages which comprises:

1. contacting said feed in the presence of hydrogen with a catalyst comprised of
   a. a metal halide wherein said metal is aluminum, gallium, tin, lead, vanadium, niobium, tantalum, arsenic, chromium, molybdenum, tungsten, rare earth and/or transuranium metal and said halide is fluoride, chloride, bromide and/or iodide, and
   b. at least an equal molar amount, based on metal halide, of a protonic acid capable of being a proton donor to the system and further being characterized by the formula HX, $R_aX_bQO_c$, or mixtures thereof where H is hydrogen, X is chlorine, bromine, fluorine and/or iodine; R is hydrogen, C_1–C_4 alkyl, C_3–C_{10} cycloalkyl and/or C_6–C_{10} aryl, Q is either phosphorus or sulfur; O is oxygen; *a* is an integer ranging from 1 to 4 and *b* and *c* are integers ranging from 0 to 6; and
2. recovering a product having an average molecular weight higher than the average molecular weight of the feed.

3,888,938

PROCESS FOR OBTAINING 2,6-DIMETHYLNAPHTHALENE-RICH OR 2,7-DIMETHYLNAPHTHALENE-RICH PRODUCT

Makoto Ogasawara; Kazuyoshi Suzuki; Takanori Urasaki; Takeo Shima; Shizuka Kurisu, and Yasuji Hirabayashi, all of Iwakuni, Japan, assignors to Teijin Limited, Osaka, Japan

Filed May 22, 1974, Ser. No. 472,440
Claims priority, application Japan, May 26, 1973, 48-58236; June 5, 1973, 48-62503
Int. Cl. C07c 5/24, 15/24
U.S. Cl. 260—668 A 4 Claims

1. In the process for obtaining a 2,6-dimethylnaphthalene-rich or 2,7-dimethylnaphthalene-rich product by carrying out the liquid phase catalytic intramolecular rearrangement, respectively, of dimethylnaphthalenes consisting of the 2,6-dimethylnaphthalene family or the 2,7-dimethylnaphthalene family whose content of the 2,6-dimethylnaphthalene or the 2,7-dimethylnaphthalene is less than its thermodynamic equilibrium concentration, wherein said rearrangement reaction is carried out at a temperature ranging from 260° to 500° C. in the presence of a mordenite catalyst; the improvement comprising using as the starting material that consisting of dimethylnaphthalene whose content of the dimethylnaphthalene family is at least 60 % by weight and not containing in excess of 10 mol% of trimethylnaphthalene, and carrying out said rearrangement reaction in the presence of a mixed catalyst consisting of

a. 70–95 % by weight of a hydrogen form of mordenite in which above 80 % by weight of the metal cations are replaced with hydrogen ions, and
b. 30–5 % by weight of a promoter selected from the group consisting of bentonite and fuller's earth.

3,888,939

PROCESS FOR SEPARATING OLEFINS BY ADSORPTION

Donald H. Rosback, Elmhurst, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Division of Ser. No. 401,782, Sept. 28, 1973. This application May 17, 1974, Ser. No. 471,069
Int. Cl. C07c *7/12*
U.S. Cl. 260—677 AD 6 Claims

1. A process for separating olefins from a feed mixture comprising olefins and saturates which process comprises contacting said mixture with an adsorbent prepared by the steps of:

a. contacting a base material comprising type X or type Y zeolite with a fluoride-containing aqueous sodium hydroxide solution at ion exchange conditions to effect the addition of sodium cations and the extraction of alumina from said base material;

b. washing the sodium-exchanged base material at washing conditions until essentially free of sodium hydroxide; and,

c. drying the material at conditions to reduce the LOI at 900° C. to less than about 10 wt. percent, thereby selectively adsorbing at adsorption conditions said olefins.

3,888,940

STEAM-ACTIVATED OLEFIN DISPROPORTIONATION CATALYSTS

Donald H. Kubicek, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 26, 1973, Ser. No. 354,550
Int. Cl. C07c *3/62*
U.S. Cl. 260—683 D 11 Claims

1. In the process of converting at least one reactant selected from the group consisting of cyclic and acyclic mono and polyene olefin hydrocarbons of at least 3 carbon atoms and mixtures of at least one such olefin hydrocarbon and ethylene according to the olefin reaction by contacting with a catalyst composition comprising molybdenum oxide or rhenium oxide on a silica, alumina, or silica- or alumina-containing support, optionally with a cobalt component when said catalyst composition is said molybdenum oxide on a support, under conditions suitable for obtaining a product of the olefin reaction which, as defined herein, can be visualized as the reaction between two first pairs of carbon atoms, carbon atoms of each first pair being connected by an olefinic double bond, to form two new pairs from the carbon atoms of said first pairs, two carbon atoms of said new pairs being connected by an olefinic double bond, within a conversion temperature range of about −60°F. to 1100°F. and a pressure in the range of about 0 to 2000 psig, the improvement which comprises the employment of a thermally activated catalyst composition prepared by the process of treating said catalyst composition under thermal activation conditions with water or water vapor at elevated temperatures of at least about 700°F and thereafter calcining said thermally treated catalyst composition.

3,888,941

MODIFIED ABS POLYMERS

Ebon Paul Weaver, Naugatuck, Conn., assignor to Uniroyal, Inc., New York, N.Y.

Filed Feb. 26, 1974, Ser. No. 446,074
Int. Cl. C08f *31/04*, *39/00*
U.S. Cl. 260—829 21 Claims

1. A thermoplastic polymer blend having improved flex fatigue resistance comprising

A. 100 parts of an acrylonitrile-butadiene-styrene interpolymer comprising styrene-acrylonitrile resin combined with a styrene-acrylonitrile monomer mixture grafted onto a rubber spine selected from polybutadiene and butadiene-styrene copolymer, wherein said interpolymer comprises 10–40% acrylonitrile monomer, 5–65% butadiene monomer, and 25–85% styrene monomer, all by weight;

B. 20 to 60 parts of an alkyl acrylate-butadiene-styrene terpolymer; and

C. 5 to 25 parts of a coumarone-indene resin, wherein the weight ratio of (B) and (C) is at least 1 to 1.

3,888,942

RESINOUS COMPOSITIONS AND LAMINATES MADE THEREFROM

Lo Kwang Tsen, Coshocton, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 13, 1973, Ser. No. 424,517
Int. Cl. C03c *25/02*
U.S. Cl. 260—830 TW 6 Claims

1. A resinous composition comprising, by weight,

a. an epoxy resin composition comprising a blend of about 50 to 90 percent of an epoxy resin having an epoxy equivalent weight of from about 170 to 200 and about 10 to 50 percent of the fusion reaction product of an epoxy resin and tetrabromobisphenol-A, said fusion reaction product having an epoxy equivalent weight of from about 900 to 1,900.

b. from about 1 to 20 parts per hundred of the epoxy resin composition of (a) of a phenoxy resin,

c. from about 25 to 75 parts per hundred of the epoxy resin composition of (a) of tricarboxylic anhydride, and

d. from about 0.01 to 0.5 part per hundred of the epoxy resin composition of (a) of a tertiary amine curing promoter.

5. A circuit board substrate characterized by a low Z-axis coefficient of expansion under heat cycling, said substrate comprising at least one lamina treated with the resinous composition of claim **2**.

3,888,943

POWDER COATING COMPOSITIONS COMPRISING A BLEND OF COREACTIVE POLYMERS - I

Santokh S. Labana, Dearborn Heights, and Ares N. Theodore, Farmington, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Dec. 19, 1973, Ser. No. 426,168The portion of the term of this patent subsequent to Dec. 25, 1990, has been disclaimed.
Int. Cl.² C08G *45/04*
U.S. Cl. 260—836 8 Claims

1. A thermosettable powder coating composition which exclusive of pigments and other non-reactive components comprises a coreactive mixture of

1. epoxy-functional copolymer of about 5 to about 20 weight percent of a glycidyl ester of a monoethylenically unsaturated carboxylic acid and about 80 to about 95 weight percent of monoethylenically unsaturated, quantitatively-monofunctional monomers, and having average molecular weight in the range of about 1500 to about 15,000 with no more than 5 percent thereof having molecular weight above 20,000.

2. an anhydride-functional copolymer of about 5 to about 20 weight percent of an anhydride of an olefinically-unsaturated dicarboxylic acid and about 80 to about 95 weight percent of monoethylenically unsaturated, quantitatively-monofunctional monomers and having average molecular weight in the range of about 1500 to about 15,000 with no more than 5 percent thereof having molecular weight about 20,000, said anhydride-functional copolymer being present in an amount such as to provide about 0.4 to about 1 anhydride group per epoxy group in the epoxy-functional copolymer, and

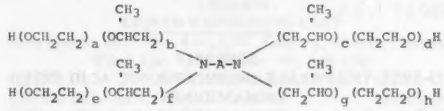
3. a polymeric flow control agent forming at least about 0.5 to about 4.0 weight percent of the mixture.

3,888,944
ANTISTATIC FIBER CONTAINING CHAIN-EXTENDED TETROLS BASED ON DIAMINES

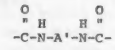
Lamberto Crescentini, and Rodney Lee Wells, both of Chester, Va., assignors to Allied Chemical Corporation, New York, N.Y.

Division of Ser. No. 271,316, July 12, 1972. This application Aug. 5, 1974, Ser. No. 494,423
Int. Cl.[2] C08G *41/04*
U.S. Cl. 260—857 PG **10 Claims**

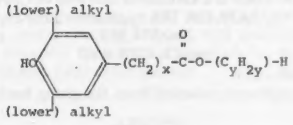
1. In a process for the formation of an antistatic polyamide fiber from a fiber-forming polyamide polymer containing about 1 to 12% by weight of an antistatic compound which is a chain-extended reaction product of a tetrol compound represented by the formula:



where *a*, *b*, *c*, *d*, *e*, *f*, *g*, and *h* are each a whole number and A is a difunctional radical from a hydrocarbon containing 1 to 13 carbon atoms, said tetrol compound having a molecular weight between about 4,000 and about 50,000 and at least one compound selected from the group consisting of compounds which yield the following divalent radical:

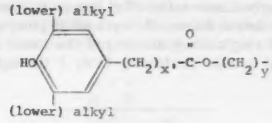


where A′ is a difunctional radical from a hydrocarbon containing 1 to 30 carbon atoms, by extruding the molten polymer through an orifice into a quenching medium and thereafter stretching the resulting filaments, the improvement comprising dissolving in the extrudate prior to extrusion at least 0.1% by weight, based on the weight of the antistatic compound, of a phenol compound selected from the group consisting of:



where *x* has a value of from 1 to 6 and y has a value of from 6 to 30; and

in which R is



wherein *x′* has a value from 1 to 6 and *y′* has a value of 1 to 6.

3,888,945
METHOD FOR PREPARING POLYMERS IN SOLID PARTICULATE FORM

Peter Joseph Arndt, Jugenheim; Horst Pennewiss, Hermann Plainer, Wilhelm Krall, all of Darmstadt; Juergen Masanek, Pfungstadt, and Manfred Mueller, Rossdorf Uber Darmstadt, all of Germany, assignors to Rohm GmbH, Darmstadt, Germany

Filed July 10, 1972, Ser. No. 270,144
Claims priority, application Germany, July 22, 1971, 2136585
Int. Cl. C08g *15/00*, *19/00*
U.S. Cl. 260—876 R **10 Claims**

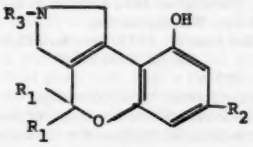
1. A method for preparing a water-soluble polymer in solid particulate form, which method comprises finely distributing droplets, of an average droplet size between 0.1 mm and 10 mm, of an aqueous solution of said polymer in a non-polar organic suspending medium which is not a solvent for said polymer, said aqueous solution of polymer comprising as the solvent therein water or a mixture of water and a polar organic solvent, said aqueous solution and said non-polar organic suspending medium being substantially immiscible whereby a liquid/liquid dispersion is formed, and then removing water from the dispersion by azeotropic distillation, at least a portion of said water being distillatively removed in the presence of an organic water-in-oil suspending agent having a polar portion solvated by said aqueous solution and a non-polar portion solvated by said non-polar suspending medium.

3,888,946
PYRANO BENZOPYRANS

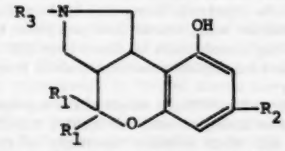
Harry G. Pars, Lexington, and Raj K. Razdan, Belmont, both of Mass., assignors to Arthur D. Little, Inc., Cambridge, Mass.

Continuation-in-part of Ser. No. 144,244, March 17, 1971, abandoned, which is a continuation-in-part of Ser. No. 842,690, July 17, 1969, abandoned. This application Feb. 14, 1973, Ser. No. 332,404
Int. Cl. C07d *27/30*
U.S. Cl. 260—326.5 B **19 Claims**

1. A member of the group consisting of compounds having the formula



and compounds having the formula



wherein R_1 is lower-alkyl; R_2 is alkyl or cycloalkyl-lower-alkyl; R_3 is hydrogen, benzyl, cycloalkyl-lower-alkyl, lower-alkenyl or lower-alkynyl; the lower-alkyl groups containing from 1

through 6 carbon atoms, the alkyl groups containing from 1 through 20 carbon atoms, the cycloalkyl groups containing from 3 to 8 ring carbon atoms and the lower-alkenyl and lower-alkynyl groups containing from 3 through 7 carbon atoms.

3,888,947

BIS-BIGUANIDES

Ronald Arthur Stephenson, Henley-on-Thames, England; Bente Lissy Laursen, Ektorp, and Ove Henning Mattsson, Taeby, both of Sweden, assignors to Kemanord Aktiebolag, Sweden

Filed May 18, 1972, Ser. No. 254,440
Claims priority, application Sweden, May 18, 1971, 6431/71
Int. Cl. C07c *101/00*
U.S. Cl. 260—501.11 **1 Claim**

1. A salt selected from the group consisting of: mono-chlorhexidine nitrilotriacetate, tri(chlorhexidine) di(diethylenetriaminepentaacetate) mono-chlorhexidine N,N-dihydroxyethylaminoacetate, mono-chlorhexidine N-hydroxyethylethylenediaminetriacetate, and mono-chlorhexidine di[N-hydroxyethylethylenediaminetriacetate].

3,888,948

POLYVINYL CHLORIDE TYPE RESINS

Peter Pinten, Cihogne Duetz; Hans Naubereit, Troisdorf-Oberlar, and Werner Trautvetter, Spich, all of Germany, assignors to Dynamit Nobel AG, Troisdorf near Cologne, Germany

Division of Ser. No. 871,665, Nov. 3, 1969, abandoned, which is a continuation of Ser. No. 797,326, Jan. 10, 1969, abandoned, which is a continuation of Ser. No. 340,783, Jan. 28, 1964, abandoned. This application May 9, 1972, Ser. No. 251,756
Claims priority, application Germany, Jan. 31, 1963, 40801
Int. Cl. C08F *15/00*
U.S. Cl. 260—878 R **7 Claims**

1. In the production of resins of the polyvinyl chloride class, the improvement which comprises dissolving polymer of ethylene and acrylic acid ester in a medium consisting essentially of vinyl chloride and polymerizing vinyl chloride, the ester moiety in said polymer being about 35–50% by weight of the polymer, and said polymer dissolved in said medium being about 5–40% by weight of the polymer-vinyl chloride mixture.

3,888,949

BLENDS OF PROPYLENE-ALPHA-OLEFIN COPOLYMERS AND POLYPROPYLENE

Chi-kai Shih, Wilmington, Del., assignor to E. I. du Pont de Nemours & Co., Wilmington, Del.

Filed June 21, 1973, Ser. No. 372,048
Int. Cl. C08f *37/18*
U.S. Cl. 260—897 A **5 Claims**

1. An intimate polymer blend comprising

a. thermoplastic elastomeric copolymer of propylene and at least one α-olefin having from 6 to 20 carbon atoms, the copolymer having stereoregular crystalline sequences and amorphous sequences, about from 10 to 50 weight percent of the copolymer being derived from the α-olefin, the remainder being derived from propylene, the copolymer having a melt index of about from 0.01 to 200 at 190°C and a crystallinity number of about from 40 to 70; and

b. about from 5 to 95%, by weight of the copolymer blend, of polymer having at least one melting transition above 155°C and which consists essentially of substantially stereoregular polypropylene, said polymeric components (a) and (b) having propylene sequences of similar stereoregularity.

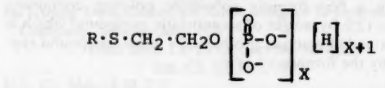
3,888,950

ARYLMERCAPTOETHYL PHOSPHATES

Saran A. Narang, Ottawa, Ontario, Canada; Surinder K. Dheer, King of Prussia, Pa., and Robert H. Wightman, Ottawa, Ontario, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Ontario, Canada

Filed Mar. 23, 1973, Ser. No. 344,237
Int. Cl. C07f *9/08*
U.S. Cl. 260—933 **3 Claims**

1. Aryl mercaptoethylphosphate compounds having the following structural formula:



where R = phenyl, or methoxy- substituted phenyl, or tolyl, and $x = 1$, 2 or 3.

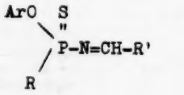
3,888,951

O-ARYL-THIONO ALKANEPHOSPHONIC ACID ESTER-ORMAMIDINES

Hellmut Hoffmann, Wuppertal-Elberfeld; Ingeborg Hammann, Cologne, and Bernhard Homeyer, Opladen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jan. 9, 1974, Ser. No. 431,833
Claims priority, application Germany, Jan. 27, 1973, 2304062
Int. Cl. C07f *9/24;* **A01n** *9/36*
U.S. Cl. 260—945 **6 Claims**

1. An O-aryl-thionoalkanephosphonic acid esterimide derivative of the formula



(I)

in which

R is lower alkyl,

R′ is mono-lower alkyl-amino or di-lower alkyl-amino, and

Ar is optionally halogen-substituted phenyl.

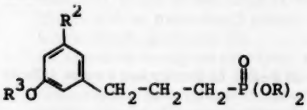
3,888,952

PHOSPHONATES

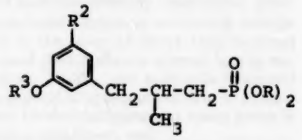
John H. Fried, Palo Alto, Calif., assignor to Syntex Corporation, Panama, Panama

Division of Ser. No. 125,854, March 18, 1971, Pat. No. 3,773,789, which is a division of Ser. No. 687,502, Dec. 4, 1967, Pat. No. 3,639,428. This application June 29, 1973, Ser. No. 374,903
Int. Cl. C07f *9/40*
U.S. Cl. 260—951 **4 Claims**

1. A phosphonate selected from the group having the formulas



and



wherein R^2 is hydrogen or lower alkoxy; R^3 is lower alkyl; and R is lower alkyl or a phenyl.

3,888,953
PREPARATION OF TRIS (2-CHLOROETHYL) PHOSPHITE

James J. Anderson, Richmond, Va., and Vasco G. Camacho, Iselin, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

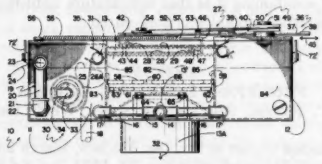
Filed Dec. 7, 1973, Ser. No. 423,049
Int. Cl. C07f 9/08
U.S. Cl. 260—977 2 Claims

1. A process for the preparation of tris (2-chloroethyl) phosphite, which comprises simultaneously adding ethylene oxide and phosphorus trichloride, in a molar ratio of between about 3.2:1 and about 3.9:1, to performed tris (2-chloroethyl) phosphite in an amount between about 10% and about 100% of the reactants at a temperature between 0°C. and about 10°C.

3,888,954
LIQUID VAPORISING UNIT

John Eberle, 2027 28th Ave., S.W., Calgary, Alberta, Canada

Filed Apr. 9, 1973, Ser. No. 349,658
Int. Cl. F02m 25/02
U.S. Cl. 261—18 A 16 Claims



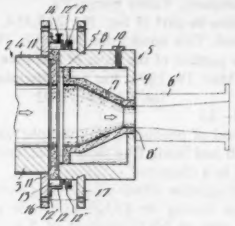
1. A liquid vaporizing device comprising in combination a liquid container, means to convey liquid to said container and means to control the level of liquid in said container, at least one flexible porous capillary strip of material in said container, an air flow passage, said strip of material extending into said passage and means to control the amount of material in said passage from a minimum amount to a maximum amount thereby controlling the amount of liquid evaporated from the strip of material by air passing through said passage, said means to control the amount of material in said passage including a control bracket assembly, means to mount said bracket assembly for movement across said air flow passage, one end of said capillary strip being secured to said bracket assembly, and means on said strip for tensioning said strip relative to said bracket assembly, said control bracket assembly including an actuating bar and a capillary strip securing bar secured at right angles to one end of said actuating bar, and spring means reacting between said assembly and said container normally biassing said assembly to the minimum material amount within said passage.

3,888,955
CONNECTION DEVICE

Saburo Maruko, 1663 Seya-machi, Seya-ku, Yokohama, Japan

Filed Mar. 21, 1974, Ser. No. 453,348
Claims priority, application Japan, Apr. 4, 1973, 48-37762
Int. Cl. B01f 3/04
U.S. Cl. 261—99 13 Claims

1. A connection device for connecting between the flue conduit extending from a combustion furnace and a washing-absorption tower and concurrently serving as high temperature flue gas quenching means, comprising a double-walled cylindrical structure including an inner porous cylinder and an outer impervious cylinder surrounding said inner cylinder in a peripherally spaced relationship to said inner cylinder to define a cooling liquid jacket therebetween; cooling liquid inlet means in said outer impervious cylinder for directing cooling liquid into said jacket; an annular porous barrier means disposed between said flue conduit and double-walled cylindrical structure for protecting said flue conduit against

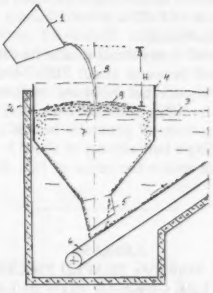


the effect of said cooling liquid; and inert gas inlet means adjacent to said barrier means. for directing inert gas through said barrier means.

3,888,956
METHOD OF MAKING GRANULATE

Nils J. Klint, Hagfors, Sweden, assignor to Uddeholms Aktiebolag, Hagfors, Sweden

Continuation-in-part of Ser. No. 788,293, Dec. 31, 1968, abandoned. This application July 17, 1970, Ser. No. 55,629
Claims priority, application Sweden, Feb. 2, 1968, 1435/68
Int. Cl. B01j 2/00
U.S. Cl. 264—5 1 Claim



1. In a method of making a granulate from normally solid but meltable material having relatively high melting point and selected from the group consisting of crude iron, steel and ferro-alloys from a melt of said material, which melt is cooled and caused to solidify in a liquid bath, the improved technique according to which a continuous stream of the material in molten state is caused freely to fall onto the upper horizontal surface of a fixed plate made from a material which is non-wettable by said melt and selected from the group consisting of refractory ceramics, graphite, refractory metal compounds and combinations of said compounds; any deviation of the stream from the vertical direction at contact with the plate not being greater than 10°; and wherein the height of the free fall of the molten metal stream and the number of centigrade degrees by which the temperature of the metal melt exceeds the solidus temperature of the metal are defined by the area A-B-C-D-E of FIG. 2 of the accompanying drawing, whereby the molten metal stream by its own kinetic energy is disintegrated against the plate into separate drops which drops spread out from the plate like an umbrella and fall down into the cooling bath where they solidify to smooth granules, at least 90 weight-percent of which granules have sizes varying from 2 mm to 25 mm and have shapes varying from round or oval discs to drops and spheres.

3,888,957
METHOD OF MAKING HOLLOW SPHERES BY SPRAY DRYING

David I. Netting, Springfield, Pa., assignor to Philadelphia Quartz Company, Valley Forge, Pa.

Continuation-in-part of Ser. No. 223,314, Feb. 3, 1972, abandoned. This application Mar. 17, 1972, Ser. No. 235,851The portion of the term of this patent subsequent to Mar. 19, 1991, has been disclaimed.

Int. Cl. B01j *2/02*

U.S. Cl. 264—13 8 Claims

1. A method of producing hollow spheres having a size of 10–400 mesh and being free from holes, comprising:

A. mixing in a chamber:

1. a first aqueous solution consisting essentially of sodium silicate having an SiO_2:Na_2O mole ratio of 1.5:1 to 4.0:1 and an Na_2O content of 5 to 20 percent on a weight basis, maintained at a temperature between room temperature and the solution boiling point, and

2. a second aqueous solution consisting essentially of 16 to 18 percent sodium pentaborate on a weight basis, maintained at a temperature between room temperature and the solution boiling point,

to produce with agitation a homogeneous third aqueous solution having a solids concentration of 5 to 35 percent, a sodium pentaborate concentration of 6 to 7 percent and a weight ratio of sodium pentaborate to Na_2O of 1.1:1 to 1.3:1 maintained at a temperature below said third solution boiling point;

B. spraying droplets of said third aqueous solution into a dryer utilizing air having an inlet temperature between 200° C and 500° C while maintaining said droplets entering said dryer at a temperature below said third solution boiling point and recovering a product consisting essentially of a mass of hollow spheres having a water content less than 25 percent;

C. subjecting said spray dried product to further drying at a temperature between about 70° – 400° C for a time sufficient to reduce the moisture content below about 7 percent and avoiding intumescence, and

D. recovering a mass of generally hollow closed spherical particles having a bulk density of about 2 – 20 lbs./ft.^{3} and a particle size within the range of 10 – 400 mesh.

3,888,958
PROCESS FOR MAKING SHAPED PIECES FROM LOW TEMPERATURE COKE OF LOW BULK WEIGHT

Harald Juntgen; Karl Knoblauch, and Dieter Zündorf, all of Essen, Germany, assignors to Bergwerksverband GmbH, Essen, Germany

Continuation-in-part of Ser. No. 125,745, March 18, 1971, abandoned. This application Jan. 24, 1973, Ser. No. 326,288

Claims priority, application Germany, Mar. 21, 1970, 2013604

Int. Cl. B29c *25/00*

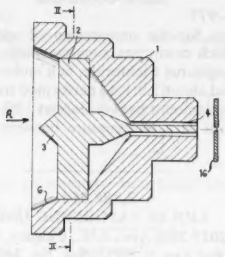
U.S. Cl. 264—29 4 Claims

1. Process for the manufacture of a ring-shaped carbonaceous body of low temperature coke type having high absorptive capacity and low bulk weight comprising the steps of:

a. preparing a plastic mixture consisting essentially of a powdered source of carbon selected from the group consisting of anthracite, charcoal, oxidized coal, coke, peat and lignite, and a binder selected from the group consisting of hard pitch, soft pitch, tar and anthracene oil, the weight proportion of the binder to carbon material ranging from about 17.5 to about 28 percent,

b. heating said mixture to a temperature between about 50°C and about 95°C and maintaining said mixture at that temperature for a sufficient time to attain an extrudable consistency and forming the mixture into a ring-shaped cylindrical body by extrusion under a pressure between about 5 and about 100 atmospheres,

c. introducing said formed body into a heating zone and heating it at a rate between about 20°C and about 70°C per minute for a sufficient time to attain a temperature from about 300°C to about 450°C said body being in a soft state with substantial exclusion of outside air from the atmosphere in said heating zone, and



d. further heating said body at a rate of about 50°C to about 500°C per minute, with limited admission of air, to a final temperature between about 600°C and to about 900°C and maintaining it at that temperature until the body is substantially completely carbonized.

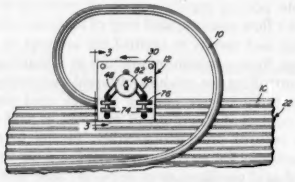
3,888,959
PROGRESSIVE MOLDING METHOD

Buster C. Phillips, 550 Morgan Street, West Liberty, Ky. 41472

Continuation-in-part of Ser. No. 238,805, March 28, 1972, abandoned. This application Nov. 15, 1973, Ser. No. 416,324

Int. Cl. E04b *1/16*

U.S. Cl. 264—32 10 Claims

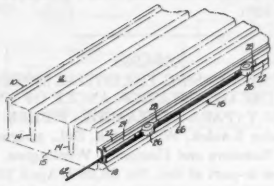


1. In a process for constructing a structural member having one surface extending in a closed path and being formed from a hardenable material by placing the hardenable material while in a workable condition against a form wall and permitting the material to harden in situ, the improvement wherein said structural member is formed progressively from one end thereof by constructing a first form wall around said closed path with said wall extending from said one end for a portion of the length of said structural member by progressively shaping a strip of material into a series of convolutions extending around said closed path to define the path wall, progressively moving said first wall along said surface from said one end by progressively removing the convolutions of said strip of material from the end of said first form wall adjacent said one end of said structural member and applying convolutions of said strip material to the other end of said first form wall, and progressively casting hardenable material against said first form wall from said one end thereof and permitting said hardenable material to harden before said convolutions of strip material are removed therefrom, whereby said structural member is progressively cast from said one end as said form wall is moved along said one surface thereof.

3,888,960
METHOD OF SETTLING FLUENT AND LIKE MATERIAL IN A FORM

Peter Augustus Fischer, Neponset, Ill., assignor to Martin Engineering Co., Neponset, Ill.

Division of Ser. No. 353,995, April 24, 1973, Pat. No. 3,839,918. This application Dec. 28, 1973, Ser. No. 429,362
Int. Cl. B28b *1/08*
U.S. Cl. 264—71 **8 Claims**



1. The method of settling a fluent or like material in an elongated form, comprising: rigidly attaching to the form an elongated track substantially coextensive in length with the form, mounting a selectively activatible and deactivatible vibrator on the track by means of a selectively lockable and releasable male-female connection enabling positioning of the vibrator along the track without dismounting thereof from the track, operating the vibrator and connection substantially in unison to activate the vibrator and lock the connection and to deactivate the vibrator and release the connection, and successively activating and deactivating the vibrator while respectively locking and releasing the connection to enable selective positioning of the vibrator lengthwise along the track, and repositioning the vibrator at selected positions spaced apart lengthwise of the track during periods of deactivation of the vibrator and release of the connection.

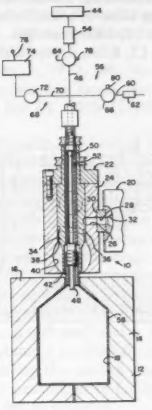
8. The method of settling a fluent or like material in an elongated structure, comprising: rigidly attaching to the structure an elongated track substantially coextensive in length with the structure, mounting a selectively activatible and deactivatible vibrator in the track by means of a selectively lockable and releasable interlocking connectors, activating and deactivating the vibrator in a starting position while locking same to the track, and moving the vibrator, while unlocked from and retained by the track, from said starting position through an infinite number of other positions along the track and locking and activating the vibrator at each of said positions.

3,888,961
BLOW MOLDING PROCESS INCLUDING ARTICLE COOLING

Roger L. Schonewald, Belle Mead, N.J., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Division of Ser. No. 295,591, Oct. 6, 1972, Pat. No. 3,807,927. This application Nov. 12, 1973, Ser. No. 414,994
Int. Cl. B29c *17/07, 25/00*
U.S. Cl. 264—89 **8 Claims**

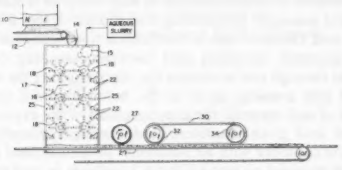
1. A blow molding process comprising the steps of providing a hollow parison of plasticized material in a mold cavity contoured to the predetermined configuration of the hollow article to be blown, forming said parison in said mold cavity into a hollow article of said predetermined configuration of said mold cavity by pressurized blowing fluid supplied internally thereof, thereafter initiating cooling of said previously blown hollow article while in the mold cavity by repeated and alternate discharge of cooling fluid from, and supply of cooling fluid into, the interior of said blown hollow article, whereby repeatedly the pressure of fluid in said blown hollow article is resultantly alternately decreased and increased and, during said cooling of said blown hollow article, maintaining a minimum fluid pressure therein sufficiently high to prevent injury to the surface of said blown hollow article.



3,888,962
INSULATING PRODUCT AND DRY PROCESS FOR ITS MANUFACTURE

Robert J. Ostertog, Bloomfield, and Anthony J. Page, North Plainfield, both of N.J., assignors to Johns-Manville Corporation, Denver, Colo.

Filed Nov. 24, 1972, Ser. No. 309,395
Int. Cl.[2] B29J *5/02*
U.S. Cl. 264—122 **10 Claims**



1. A continuous dry process for making a low density perlite board comprising:

a. feeding 12 to 38 parts per 100 of expanded perlite, and a stream of 62, to 88 parts per 100 of aqueous slurry to a mixing zone containing air, said slurry including about 5 to 15 percent of binder solids and said perlite being the major solids component in the combination of perlite and slurry and in the ultimately formed board;

b. passing the perlite and the slurry through the mixing zone while exposing the mix to intense mechanical shearing forces for less than about 10 seconds to intimately admix the solids components of the mix and form a fluffy mass having a density on a dry basis of from 5.5 to 7.0 lb/cu. ft.;

c. continuously depositing said fluffy mass across the width of a traveling endless conveyor to form board stock;

d. shaping the top surface of said board stock to obtain a planar top surface;

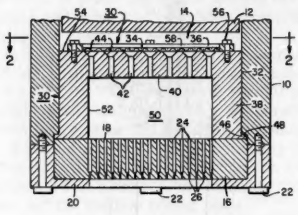
e. compressing said board stock to the desired board thickness; and

f. evaporating water from the compressed board.

3,888,963
IN-LINE HOMOGENIZING OF EXTRUDABLE CERAMIC BATCH MATERIALS

Francis L. Orso, and Giacomo J. Piazza, both of Corning, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Sept. 18, 1973, Ser. No. 398,379
Int. Cl. B28b 3/20, 17/02
U.S. Cl. 264—176 R 4 Claims



1. In a discontinuous process of extruding ceramic batch material wherein an interface is formed between individual successive batch charges, a method for eliminating interfacial discontinuities between adjacent batch portions which comprises, loading an extrusion chamber with an initial predetermined amount of batch material so that all batch interfaces within said chamber are at least a given predetermined distance upstream from an extrusion die attached to an outlet end of said chamber, applying a pressing force to the predetermined batch material loaded within said extrusion chamber and flowing said batch material through a plurality of passages within said chamber downstream of said predetermined distance but upstream of said extrusion die, breaking up and dissipating interfacial discontinuities in the batch material as said material is passed through said passages, forming a plurality of strands of batch material as said material is discharged from said passages, compacting said strands of batch material within said chamber into a continuous homogeneous slug of batch material, extruding said homogeneous slug of batch material through said extrusion die, discontinuing the application of said pressing force to the batch material so that a portion of said material remains upstream of the extrusion die at least said given predetermined distance, reloading said extrusion chamber with an additional predetermined amount of batch material so that all batch interfaces in said chamber are at least said predetermined distance upstream of the extrusion die, and again applying a pressing force to the batch material to flow such material through said passages, compact the resulting strands and extrude such material through the extrusion die in the manner set forth with regard to the initial batch material.

3,888,964
THERMALLY REVERSIBLE POLYMER COMPOSITIONS PREPARED FROM POLYISOTHIOCYANATES

Peter James Stratford Bain, Lower Hutt, New Zealand; Ernest Bryson McCall, Bierges, Belgium, assignors to Monsanto Chemicals Limited, London, England

Filed Apr. 18, 1974, Ser. No. 461,905
Claims priority, application United Kingdom, Apr. 25, 1973, 19563/73
Int. Cl. B29c 25/00
U.S. Cl. 264—236 16 Claims

1. A thermally reversible vulcanizate having a molecular structure wherein polymer chains of a diene polymer or copolymer are linked, directly or via groups pendant from the polymer chains, by units having the formula

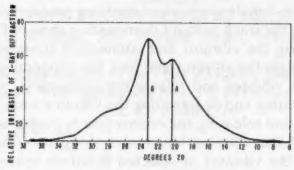
$$-NR'-\overset{S}{\overset{\|}{C}}-NH-R(-NH-\overset{S}{\overset{\|}{C}}-NR'-)_n$$

where R is an organic radical such that the adjacent nitrogen atoms are each linked to a non-aromatic carbon atom of R, R' is a hydrogen atom or an aliphatic or cycloaliphatic group, *n* is an integer having a value of at least 1, each of the terminal nitrogen atoms of the unit being linked to a non-aromatic carbon atom of the polymer chain or of a group pendant from the polymer chain.

3,888,965
METHOD OF INCREASING THE INITIAL MODULUS AND REDUCING THE ORIENTATION ANGLE OF UNDRAWN POLY (PARA-BENZAMIDE) FIBERS

Stephanie Louise Kwolek, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 30,089, April 20, 1970, abandoned, which is a continuation of Ser. No. 644,851, June 9, 1967, abandoned, which is a continuation-in-part of Ser. No. 556,934, June 13, 1966, abandoned. This application Feb. 9, 1973, Ser. No. 331,322
Int. Cl. B29c 25/00
U.S. Cl. 264—342 RE 1 Claim



1. A method for increasing the initial modulus and reducing the orientation angle of undrawn fibers consisting essentially of poly(p-benzamide having an orientation angle of up to about 55° comprising heating the undrawn fibers at a temperature of at least 350°C. While under tension or, while relaxed.

3,888,966
ENHANCED COBALT RECOVERY FROM AMMONIACALLY LEACHED REDUCED ORES USING CYANIDE, HYDRAZINE, OR HYDROXYLAMINE COMPOUNDS

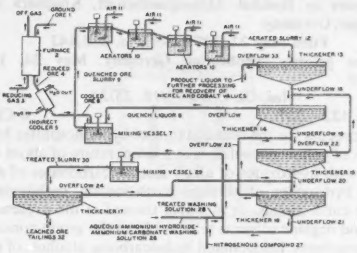
David James Miller, Gretna, La., assignor to Freeport Minerals Company, New York, N.Y.

Filed June 2, 1972, Ser. No. 259,081
Int. Cl. C01g 51/12
U.S. Cl. 423—150 8 Claims

1. In a reduced ammoniacal leaching process for the recovery of nickel and cobalt values from an ore which comprises treating a slurry consisting of (a) a solid phase comprising a reduced cobalt containing ore and (b) a liquid phase comprising an aqueous ammoniacal solution having a pH above 7, with a gas containing elemental oxygen in at least one leaching stage to solubilize nickel and cobalt values of the ore in the liquid phase of the slurry, and then washing the slurry with an ammoniacal washing solution in at least one washing stage, without passing a gas containing elemental oxygen through the slurry during the washing stage, to recover a product liquor containing the solubilized nickel and cobalt values:

the improvement for enhancing the solubility of the cobalt values of the ore in the liquid phase of the slurry which comprises providing in the slurry, during the washing stage, a nitrogenous compound selected from the group

consisting of hydrazine and a soluble salt of hydrazine, wherein the amount of the compound in the slurry is



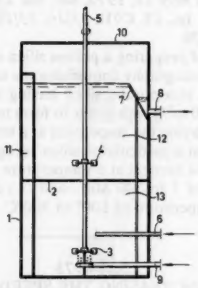
sufficient to provide a hydrazine content, expressed as N_2H_4, of from about 0.01 to 10% of the total weight of slurry.

3,888,967

METHOD AND APPARATUS FOR OXIDIZING SULPHIDE-CONTAINING AQUEOUS SOLUTIONS

Per-Erik Andersson, and Einar Horntvedt, both of Sundsvall, Sweden, assignors to Svenska Cellulosa Aktiebolaget, Sundsvall, Sweden

Filed Feb. 9, 1973, Ser. No. 331,298
Claims priority, application Sweden, Mar. 8, 1972, 2936/72
Int. Cl. C01b *17/64*
U.S. Cl. 423—206 **1 Claim**



1. A method of converting to a non-volatile reaction product comprising sodium thiosulphate the sodium sulphide content of soda solution containing finely divided active carbon obtained by recovering chemicals from waste liquor from the digestion of lignocellulosic material, in which recovery process the waste liquor is evaporated to a content of solid material of at least 40%, and thereafter is pyrolyzed at a temperature of 700°–800°C. under reducing conditions for the production of a combustible gas and a solid residue and containing active carbon from the pyrolyzing step, sodium carbonate and sodium sulphide, according to which method said solid residue is separated and dispersed in water, the dispersion is oxidized by means of an oxygen-containing gas, under stirring, the amount of active carbon in the dispersion amounting to from 1 to 150 grams of carbon per liter of solution and the gas being introduced into the body of the solution, at a locus adjacent the bottom of the body, at a temperature of 10°–90°C., the gas being maintained in intimate contact with the solution for a period of 2–40 minutes.

3,888,968

METHOD OF SEPARATING IMPURITIES FOR REMOVAL IN DESULFURIZATION OF EFFLUENT GAS IN A WET LIME-GYPSUM PROCESS

Masumi Atsukawa; Naoharu Shinoda, and Haruo Kuwubara, all of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Japan

Filed Nov. 8, 1972, Ser. No. 304,638
Claims priority, application Japan, Nov. 11, 1971, 46-90115
Int. Cl. C01b *17/00*
U.S. Cl. 423—242 **2 Claims**

1. In a method for the removal of sulfur oxide from an effluent gas using a wet lime-gypsum process wherein sulfur oxide is removed from a sulfur oxide containing gas by passing the gas through a cooling tower to remove carbon dust therefrom, and then through a gas adsorption column containing a lime slurry as an absorbent to produce calcium sulfite, passing the calcium sulfite through an oxidizer to convert it to calcium sulfate in the form of a gypsum slurry which is then passed through a slurry concentrator wherein the supernatant fluid therefrom is passed to a neutralizer to precipitate the hydroxides of the metallic impurities, and a filter to separate the hydroxides and to obtain a purified filtrate, the improvement which comprises adding the carbon dust obtained from the cooling tower to the neutralizer to facilitate the precipitation and flocculation of the hydroxides.

3,888,969

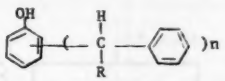
ANTIOXIDANT FOR THE AQUEOUS SOLUTIONS OF SULFITE AND/OR BISULFITE OF SODIUM OR POTASSIUM AND PROCESS FOR PREVENTING THE OXIDATION OF SAID AQUEOUS SOLUTION

Kensuke Kawamoto; Tomoaki Tsuno, and Teruo Namiki, all of Kitakyushu, Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Filed Sept. 5, 1972, Ser. No. 286,559
Int. Cl. C01b *17/00*
U.S. Cl. 423—243 **10 Claims**

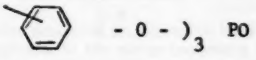
1. A composition for the absorption of sulfur dioxide which comprises antioxidant and aqueous solutions of sodium or potassium sulfite or bisulfite or mixtures thereof, said antioxidant being taken from the class consisting of

1. substituted phenols represented by the formula:



wherein R is a lower alkyl group and *n* is an integer of from 1 to 5

2. tris (alkylphenyl) phosphates represented by the formula:



wherein R^1 is an alkyl group having 6–18 carbon atoms

3. trialkyl phosphites represented by the formula:

$$(R^1 - O -)_3 P$$

wherein R^2 is an alkyl group having 8–18 carbom atoms

4. glycerin monofatty acid esters represented by the formula:

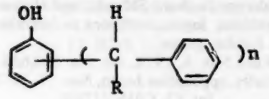
$$R^3 COOCH_2CH(OH)CH_2OH$$

wherein R^3 is an alkyl group having 8–22 carbon atoms

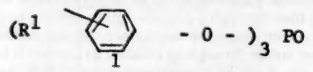
said antioxidant being present in an amount of 1 to 5000 ppm based on the weight of said solutions.

2. The method for absorbing and removing sulfur dioxide from waste gas which comprises contacting waste gas containing sulfur dioxide with a composition containing aqueous solutions of sodium or potassium sulfite or bisulfite or mix-

tures thereof and 1 to 5000 ppm based on the weight of said solutions of an antioxidant taken from the class consisting of
1. substituted phenols represented by formula:



wherein R is a lower alkyl group and *n* is an integer of from 1 to 5
2. tris (alkylphenyl) phosphates represented by the formula:



wherein R^1 is an alkyl group having 6–18 carbon atoms
3. trialkyl phosphites represented by the formula:

$$(R^2 - O -)_3 P$$

wherein R^2 is an alkyl group having 8–18 carbon atoms
4. glycerin monofatty acid esters represented by the formula:

$$R^3\ COOCH_2CH(OH)CH_2OH$$

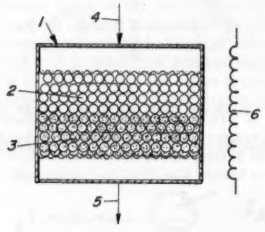
wherein R^3 is an alkyl group having 8–22 carbon atoms.

3,888,970

DOUBLE LAYER CATALYST BED FOR REMOVING SO_2 FROM WASTE GASES

Larry A. Haas, Burnsville; Sanaa E. Khalafalla, and Thomas H. McCormick, both of Minneapolis, all of Minn., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Feb. 12, 1973, Ser. No. 331,726
Int. Cl. B01d *53/34;* **C01b** *17/04*
U.S. Cl. 423—244 **6 Claims**



1. A process for removing SO_2 from a dry waste gas comprising passing said waste gas through a single bed of catalyst said bed having a temperature of about 400°C in the presence of CO; said CO and SO_2 being present in a CO:SO_2 mole ratio of at least 2:1; said bed consisting of a first and second layer of catalyst, said first layer consisting of iron, chromium, nickel, cobalt or manganese supported on alumina, said second layer consisting of alumina; and wherein said gas enters said bed through said first layer, passes therethrough into said second layer, and exits from said bed from said second layer.

3,888,971

PROCESS FOR THE MANUFACTURE OF HYPOPHOSPHITES

Wolfgang Scheibitz, Hurth-Knapsack; Horst Staendeke, Bruhl, and Siegfried Burkhardt, Bruhl-Kierberg, all of Germany, assignors to Hoechst Aktiengesellschaft, Knapsack near Cologne, Germany

Filed May 22, 1972, Ser. No. 255,442
Claims priority, application Germany, May 24, 1971, 2125587
Int. Cl. C01b *15/16, 25/26*
U.S. Cl. 423—307 **6 Claims**

1. A process for the manufacture of hypophosphites by the reaction of yellow phosphorus at a temperature of about 40°C – 90°C with hydroxides of alkali metals, carbonates of alkali metals, hydroxides of alkaline earth metals, carbonates of alkaline earth metals, or mixtures thereof in the presence of water and organic solvents selected from the group consisting of hydrocarbons, halogenated hydrocarbons, alcohols of more than 5 carbon atoms or amines of more than 10 carbon atoms, which combine the property of dissolving phosphorus with immiscibility or limited miscibility with water and are liquid at the reaction temperature and, following completion of the reaction, separating with a separator from the resulting non-aqueous phase of the organic solvents the resulting aqueous phase having hypophosphites therein.

3,888,972

PROCESS FOR PREPARATION OF WIDE-PORE ADSORBENT FOR USE IN CHROMATOGRAPHY

Andrei Vladimirovich Kiselev, Leninskie Gory, MGU, Zona "M", kv. 160, Moscow; Galina Lvovna Kustova, ulitsa Burevestnika, 9, kv. 9; Boris Alexandrovich Lipkind, ulitsa Burevestnika, 9, kv. 3, both of Gorky, and Jury Stepanovich Nikitin, Leningradskoe shosse, 120, korpus 3, kv. 4, Moscow, all of U.S.S.R.

Filed May 11, 1972, Ser. No. 252,462
Int. Cl. C01b *33/16, 33/18*
U.S. Cl. 423—338 **2 Claims**

1. A process of preparing a porous silica adsorbent adapted for use in chromatography comprising the steps of (1) mixing finely dispersed non-porous silica having a specific surface area of 35 to 380 m^2/g with water to form an aqueous suspension; (2) spray drying the suspension at a temperature of 400° to 450°C. to form a particulated silica xerogel; (3) hydrothermally treating the xerogel at a temperature of 100° to 380°C. and a pressure of 1 to 300 atm.; and (4) drying the treated xerogel at a temperature of 100° to 300°C.

3,888,973

METHOD OF INCREASING THE SPEED OF CHEMICAL REACTION BETWEEN LIQUID AND SOLID REACTANTS USING CENTRIFUGAL FORCE

Robert E. Colwell, Palos Park; William A. Liegois, Palos Hills; Gerald W. Wilks, Grays Lake, and Mihailo J. Vrcelj, La Grange Park, all of Ill., assignors to Continental Can Company, Inc., New York, N.Y.

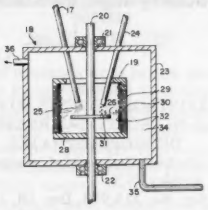
Filed Oct. 24, 1972, Ser. No. 300,071
Int. Cl. C01g *49/10*
U.S. Cl. 423—493 **10 Claims**

1. A process for effecting a heterogeneous chemical reaction between a first reactant in a solid, particulate phase and a second reactant in a liquid phase comprising the steps of

charging the solid, particulate reactant to a reaction chamber having a plurality of openings in its sidewalls, the size of the openings being smaller than the size of the solid particulate reactant,

rotating the chamber with sufficient rotational speed to generate a centrifugal force to cause the solid particulate reactant to be propelled outwardly against the walls of the chamber and be fixed thereon to form a continuous bed of solid particulate reactant,

charging the second reactant to the rotating chamber, the second reactant being propelled outward into contact with the bed of solid particulate reactant fixed on the walls of the chamber and caused to move radially therethrough under the action of centrifugal force, the second



reactant during its passage through the solid particulate layer entering into chemical reaction with the solid particulate layer and then

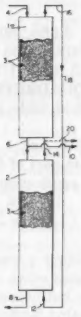
collecting the chemical reaction product expelled from the chamber through the openings therein.

3,888,974

PROCESS FOR HYDROGEN ISOTOPE EXCHANGE AND CONCENTRATION BETWEEN LIQUID WATER AND HYDROGEN GAS AND CATALYST ASSEMBLY THEREFOR

William H. Stevens, Deep River, Ontario, Canada, assignor to Atomic Energy of Canada Limited, Ottawa, Ontario, Canada

Filed July 13, 1973, Ser. No. 379,164
Claims priority, application Canada, Jan. 28, 1970, 73320
Int. Cl. C01b *5/00;* **B01j** *9/04, 11/08*
U.S. Cl. 423—580 **15 Claims**



1. A bithermal, catalytic, isotope exchange process for hydrogen isotope concentration between liquid water and hydrogen gas, comprising:

a. contacting at a temperature in the range 15℃ to 70℃, in a first section liquid feed water and, the hydrogen gas from a second section with one another and with a catalyst consisting of at least one catalytically active metal selected from Group VIII of the Periodic Table so that the deuterium isotope of hydrogen is transferred to and concentrated in the liquid water passing through and leaving the first section from the hydrogen gas passing through and leaving the first section, in either counter-current or cocurrent flow,

b. contacting at a temperature in the range 150℃ to 200℃, in a second section pressurized to keep water liquefied, the liquid water from the first section and the hydrogen gas, passing to the first section, with one another and with a catalyst consisting of at least one catalytically active metal selected from Group VIII of the Periodic Table so that the hydrogen isotope deuterium is transferred to and concentrated in the hydrogen leaving the second section from the liquid water passing through the second section, and

c. withdrawing from between the first and second sections a portion of the liquid water having the hydrogen isotope deuterium concentrated therein or the hydrogen gas having the hydrogen isotope deuterium concentrated therein, and wherein the improvement comprises:

d. the catalyst is provided in the first and second sections as at least one catalyst assembly, and comprises the catalyst and a substantially liquid-water-repellent organic resin or polymer coating thereon, which is permeable to water vapour and hydrogen gas, whereby:

e. each catalyst assembly causes hydrogen isotope exchange and concentration to occur as follows:

$$HD\ gas + H_2O\ vapour \xrightarrow{catalyst} H_2\ gas + HDO\ vapour,$$

and

$$HDO\ vapour + H_2O\ liquid \xrightarrow{liquid\ water} HDO\ liquid + H_2O\ vapour$$

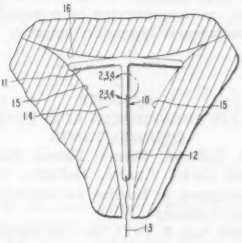
so that direct contact between the catalyst metal and liquid water and wetting of the catalyst is retarded by the organic polymer or resin coating, thereby retarding poisoning of the catalyst by the liquid water.

3,888,975

ERODIBLE INTRAUTERINE DEVICE

Peter W. Ramwell, Palo Alto, Calif., assignor to Alza Corporation, Palo Alto, Calif.

Filed Dec. 27, 1972, Ser. No. 318,890
Int. Cl. A61k *27/12*
U.S. Cl. 424—15 **2 Claims**



1. An intrauterine device for the controlled local administration of prostaglandin to the uterus comprising a hollow cervical cylindrical body having a central passageway shaped and sized for insertion and retention in the uterus, the body made of a release rate controlling material consisting essentially of cross-linked gelatin that is cross-linked with a member selected from the group consisting of an aldehyde, ketone, carbodimide and dicarboxylic acid at a concentration of 0.01 to 60% by weight of gelatin at a temperature of 4℃ to 35℃ for a reaction period of 0.1 hour to 5 days, the material containing from about 250 micrograms to about 100 milligrams of a prostaglandin that induces uterine contractions, the release rate controlling material bioeroding at a controlled rate over a period of 3 hours to 30 days in response to the environment of the uterus and concurrently therewith releasing 1 microgram to 25 micrograms per hour of the dispersed prostaglandin to the uterus to produce the desired result.

3,888,976
ZINC AND STRONTIUM ION CONTAINING EFFERVESCENT MOUTHWASH TABLET

William P. Mlkvy, Hollystone Farm, R.D. No. 2, Holland, Pa. 18966, and Raymond J. Tucci, 347 Saly Rd., Yardley, Pa. 19067

Continuation-in-part of Ser. No. 290,914, Sept. 21, 1972, Pat. No. 3,772,431. This application Nov. 1, 1973, Ser. No. 411,949The portion of the term of this patent subsequent to Nov. 13, 1990, has been disclaimed.
Int. Cl. A61k 9/00, 11/02, 11/04
U.S. Cl. 424—44 4 Claims

1. An effervescent mouthwash tablet comprising an effervescent couple consisting of at least one each of a solid pharmaceutically acceptable acid and a solid pharmaceutically acceptable base material, which effervescent couple reacts to produce carbon dioxide when dissolved in water causing effervescence, and an effective amount of strontium ion, zinc ion and mixtures thereof as an astringent-desensitizing agent.

3,888,977
MODIFIED NEUROTOXIN

Murray J. Sanders, 3009 Spanish Trl., Delray Beach, Fla. 33444

Filed Feb. 1, 1973, Ser. No. 328,724
Int. Cl. A61k 27/00
U.S. Cl. 424—98 22 Claims

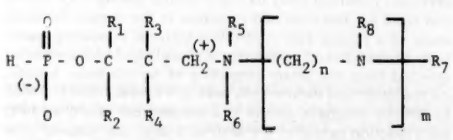
1. A method of treatment of animals suffering from a progressive degenerative neurological disease of motor nerve cell origins to neuromuscular junction, axones and nerve myelin sheaths comprising administering to the animal a disease mitigating amount of detoxified, and neurotropically active modified snake venom neurotoxin composition wherein the said snake venom neurotoxin is derived from the venom of a species of the Bungarus genus or from the venom of a species of the Bungarus genus and the Naja genus, and wherein said composition exhibits at least a 30% inhibition of plaques in the Semliki Forest virus test and a bioassay shows that the composition is atoxic, as demonstrated by essentially no signs of toxicity in inoculation of laboratory animals.

3,888,978
CERTAIN PHOSPHORUS ACID ESTERS AS DISINFECTANTS

Dieter Düwel, Hofheim, Taunus; Helmut Diery, Kelkheim, Taunus, and Ulrich Cuntze, Hofheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Aug. 9, 1973, Ser. No. 386,858
Claims priority, application Germany, Aug. 12, 1972, 2239790; Apr. 14, 1973, 2319046
Int. Cl. A01n 9/36
U.S. Cl. 424—199 11 Claims

1. A disinfectant composition comprising a disinfectant amount of an active compound of the formula



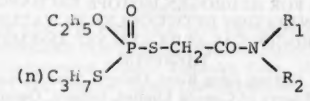
in which R_1 and R_2 each represents hydrogen or methyl,
R_3, R_4, R_5, R_6 and R_8 each represents hydrogen or alkyl of from 1 to 4 carbon atoms, R_7 represents alkyl or alkenyl of from 8 to 18 carbon atoms,
n stands for 2 or 3,
m is an integer from zero to 4,
R_2 being hydrogen when *m* is 1 to 4,
R_3 and R_4 being hydrogen when *m* is zero and R_1 and R_2 are methyl, and
R_4 being hydrogen when *m* is zero and R_3 is propyl or butyl, said active compound being present in an amount of from 20 to 90 percent by weight, the balance being water.

3,888,979
CONTROL OF PESTS WITH O-ETHYL-S-(N)-PROPYL-S-CARBAMOYLALKYL DITHIOPHOSPHATES

Ernst Beriger, Allschwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 315,973, Dec. 18, 1972, Pat. No. 3,845,171. This application Aug. 19, 1974, Ser. No. 498,347
Claims priority, application Switzerland, Dec. 24, 1971, 18909/71; Nov. 3, 1972, 16041/72
Int. Cl. A01n 9/36
U.S. Cl. 424—211 5 Claims

1. A pesticidal composition for combating pests selected from the group consisting of insects, acarids and nematodes which comprises (1) as active ingredient a pesticidally effective amount of a compound of the formula



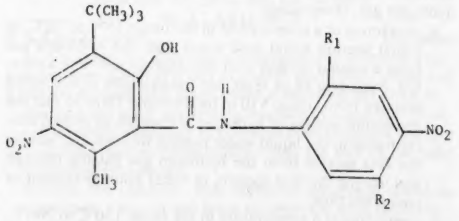
wherein R_1 represents hydrogen or methyl and R_2 represents $-CH_2OCH_3$, $-C_2H_4OCH_3$ or $-C_3H_6OCH_3$, and (2) a pesticide carrier.

3,888,980
ANTIMICROBIAL COMPOUNDS OF 2', 5' SUBSTITUTED NITROANILIDES OF SUBSTITUTED NITROSALICYLIC ACID FOR QUADRUPED ANIMALS

William H. Meek, Northfield, Ohio, assignor to Ferro Corporation, Cleveland, Ohio

Division of Ser. No. 277,075, Aug. 1, 1972, Pat. No. 3,801,637, which is a continuation-in-part of Ser. No. 186,514, Oct. 4, 1971, abandoned. This application Dec. 26, 1973, Ser. No. 427,816
Int. Cl. A61k 27/00
U.S. Cl. 424—230 10 Claims

1. A process for treating a parasite-infested quadruped animal comprising administering orally to said animal an antiparasitically effective but nontoxic quantity of a nitroanilide of 3-tert.butyl-6-methyl-5-nitrosalicylic acid having the general formula:



in which R_1 is hydrogen, alkyl of 1 to 4 carbon atoms, or alkoxy of 1to 4 carbon atoms, and R_2 is hydrogen or methyl.

3,888,981

TREATMENT OF BENIGN PROSTATIC HYPERTROPHY

Clara Revesz, Montreal, Quebec, Canada, assignor to American Home Products Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 442,270, Feb. 13, 1974, abandoned, which is a continuation of Ser. No. 259,707, June 5, 1972, abandoned. This application Sept. 3, 1974, Ser. No. 502,338

Int. Cl. A61k *17/00*

U.S. Cl. 424—242 1 Claim

1. A method of treating a male human adult afflicted with the symptoms of benign prostatic hypertrophy which comprises administering orally to said male human adult an alleviating amount of from 30 to 100 mg/day of medrogestone, daily, until statistically significant improved changes in the manifestation of symptoms of benign prostatic hypertrophy are obtained, without causing overt signs of masculinization, feminization or suppression of adrenal function.

3,888,982

CHEMOSTERILANT TRIARYL TIN COMPOUNDS

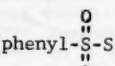
Eugene E. Kenaga, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 422,554, Dec. 31, 1964, Pat. No. 3,577,548, which is a continuation-in-part of Ser. No. 244,917, Dec. 17, 1962, abandoned. This application Oct. 27, 1969, Ser. No. 871,356

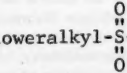
Int. Cl. A61k *27/00*

U.S. Cl. 424—245 11 Claims

1. A method useful in controlling population growth which comprises administering to an animal a minimal sterilant amount of a triaryltin compound selected from the group consisting of $R_3 - Sn - Z$ and $(R_3 - Sn)_2 Y$ wherein, in all of its occurrences in any given triaryltin compound, R represents the same member selected from the group consisting of phenyl, pyridyl, mono-substituted phenyl wherein the substituent is a member selected from the group consisting of halo, loweralkyl, and loweralkoxy, and mono-substituted pyridyl wherein the substituent is a member selected from the group consisting of halo, loweralkyl, and loweralkoxy; Z represents a monovalent moiety selected from the group consisting of (phenylloweralkyl), a 2 to 12 carbon alkenyl, a 4 to 12 carbon alkadienyl, a 5 to 6 carbon cycloalkenyl, a 5 to 6 carbon cycloalkadienyl, halo, hydroxy, mercapto, hydrogen, a 2 to 18 carbon alkanoate, a 3 to 18 carbon alkenoate, loweralkoxy, loweralkylthio, diloweralkylcarbamate, diloweralkylthiocarbamate, diloweralkyldithiocarbamate, radical of the formula



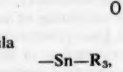
radical of the formula



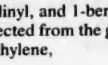
radical fo the formula

$$-Sn-R_3,$$

1-imidazolyl, 1-aziridinyl, and 1-benzimidazolyl; Y represents a divalent moiety selected from the group consisting of —O—, —S—, methylene, ethylene,



carbonyl, 1,3-butadien-1,4-ylene, and



wherein *g* is an integer of from 1 to 10, both inclusive; wherein in R_3SnZ compounds, when R is phenyl or a said mono-substituted phenyl, Z is 1-imidazolyl, 1-aziridinyl or 1-benzimidazolyl, and wherein, when Z is a said monovalent moiety other than 1-imidazolyl, 1-aziridinyl or 1-benzimidazolyl, R is pyridyl or a said mono-substituted pyridyl; and wherein, in $(R_3Sn)_2Y$ compounds, R is pyridyl or a said mono-substituted pyridyl moiety.

3,888,983

DERIVATIVES OF THIAZOLINO-PYRIMIDIN-6-ONES, IN INDUCING ANALGESIA

Jacques L. E. Baetz, La Garenne-Colombes, France, assignor to Seperic, Morat, Switzerland

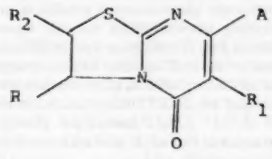
Division of Ser. No. 222,291, March 8, 1972, abandoned, which is a continuation-in-part of Ser. No. 168,212, Aug. 2, 1971, abandoned. This application June 15, 1973, Ser. No. 370,233

Claims priority, application United Kingdom, Aug. 14, 1970, 168,212/70

Int. Cl. A61k *27/00*

U.S. Cl. 424—251 15 Claims

1. A method of inducing analgesia in a patient comprising administering to said patient by any of the oral, parenteral and rectal routes, a quantity of from 100 to 300 mg of an active principle selected from a thiazolino-pyrimidin-5-one compound of the formula



in which:

R, R_1 and R_2 are each selected from hydrogen and the (1-4C) alkyl groups, and

A is selected from (a) the phenyl group, and the phenyl group substituted with halogen, (1-4C) alkyl, (1-4C) alkoxy and trifluoromethyl groups, and (b) cycloalkyl having up to 6 C-phenyl-(1-4C) alkyl, trifluoromethyl and (1-4C) alkyl groups, and a pharmaceutically acceptable acid addition salt thereof.

3,888,984

OXAZOLE AND IMIDAZOLE DERIVATIVES AS ANTIFUNGAL AGENTS

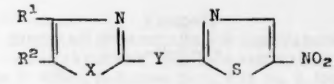
Peter Graham Hughes, Sunningdale, and John Pomfret Verge, Middle Assendon, both of England, assignors to Lilly Industries Limited, London, England

Division of Ser. No. 234,337, March 13, 1972, Pat. No. 3,813,401. This application Feb. 8, 1974, Ser. No. 440,906

Int. Cl. H61k *27/00*

U.S. Cl. 424—270 10 Claims

1. Fungicidal composition comprising as an active ingredient a fungicidally effective amount of a compound of the formula



wherein Y is sulphur or a sulphonyl group; X is oxygen or -NR^3; R^3 is selected from hydrogen, C_{1-4} alkyl, C_{1-4} hydroxyalkyl, C_{2-4} alkenyl, phenyl and phenyl-C_{1-4} alkyl; and R^1 and R^2 are individually selected from hydrogen, C_{1-4} alkyl and phenyl, or R^1 and R^2 together form a —CH=CH—CH—CH=R^4— chain wherein R^4 is =CH— or =N—, in association with a non-phytotoxic carrier or diluent therefor.

3,888,985

METHOD AND COMPOSITION FOR LOWERING INTRAOCULAR PRESSURE

Wilbur Lippmann, Montreal, Quebec, Canada, assignor to Ayerst McKenna and Harrison Ltd., Montreal, Quebec, Canada

Continuation-in-part of Ser. No. 387,842, Aug. 13, 1973, abandoned, which is a continuation of Ser. No. 188,508, Oct. 12, 1971, abandoned, which is a division of Ser. No. 878,581, Nov. 20, 1969, abandoned. This application Nov. 4, 1974, Ser. No. 520,396

Int. Cl. A61k *27/00*

U.S. Cl. 424—275 **6 Claims**

1. The method of lowering intraocular pressure which comprises administering topically to the eye of a person suffering from an open-angle glaucomatous condition an intraocular pressure lowering amount of an isotonic aqueous solution containing about 1 to 10 milligrams per milliliter, as the base, of epinephrine or an acid addition salt of epinephrine with a pharmaceutically acceptable acid, in conjunction with a potentiating amount of 1 to 5 milligrams per milliliter, as the base, of N,3,3-trimethyl-1-phenyl-1-benzo[c]-thiophenepropylamine or of its acid addition salt with a pharmaceutically acceptable acid.

3,888,986

CERTAIN 1-(5-NITRO-2-THIENYL)-1-ACYLAMIDOALKANES FOR TREATING HISTOMONIASIS

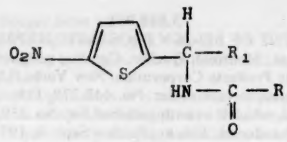
Eric Panitz, Hamilton Square, and Peter J. L. Daniels, Cedar Groove, both of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Filed Jan. 28, 1974, Ser. No. 437,409

Int. Cl. A61k *27/00*

U.S. Cl. 424—275 **5 Claims**

2. A process for inhibiting or treating histomoniasis in poultry which comprises orally administering to said poultry an amount, sufficient to inhibit or treat histomoniasis, of a thiophene of the formula:



wherein R is alkly having 1 to 6 carbon atoms, and R_1 is alkyl having 1 to 4 carbon atoms.

3,888,987

DERIVATIVES OF CERTAIN GERANYL PHENYL ETHERS AND THEIR USE IN CONTROLLING INSECTS

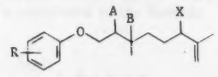
Ferenc M. Pallos, Walnut Creek, and Chien K. Tseng, El Cerrito, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 198,018, Nov. 4, 1971, Pat. No. 3,772,365. This application July 5, 1973, Ser. No. 376,772

Int. Cl. A01n *9/28*

U.S. Cl. 424—278 **6 Claims**

1. A method of controlling *Tenebrio molitor* comprising applying thereto at any stage of their development a metamorphosis hindering amount of a compound of the formula:



in which R is hydrogen; 3 or 4-halogen; 3 or 4-alkyl having 1 to 6 carbon atoms; 3 or 4-alkoxy having 1 to 4 carbon atoms; 4-allyl; 4-alkylthio having 1 to 4 carbon atoms; or 4-nitro; X is chlorine or bromine; and A and B together form an epoxide link.

3,888,988

OXOBENZOFURAN CARBOXAMIDES IN ALLEVIATING INFLAMMATION

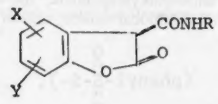
Saul B. Kadin, New London, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 246,491, April 21, 1972, Pat. No. 3,829,446, which is a division of Ser. No. 81,162, Oct. 15, 1970, Pat. No. 3,676,463. This application Mar. 15, 1974, Ser. No. 451,424

Int. Cl. A61u *27/00*

U.S. Cl. 424—279 **10 Claims**

1. A method for alleviating inflammation in the treatment of a subject afflicted with inflammatory disorders, which comprises administering to said subject an effective amount of a compound selected from the group consisting of a 2-oxobenzofuran carboxamide of the formula



and the base salts thereof with pharmacologically acceptable cations, wherein X and Y are each a member selected from the group consisting of hydrogen, fluorine, chlorine, bromine, alkyl and alkoxy each having from one to five carbon atoms, trifluoromethyl and trifluoromethoxy; and R is a member selected from the group consisting of naphthyl, phenyl and mono and di-substituted phenyl wherein esch substituent is chosen from the group consisting of fluorine, chlorine and bromine, alkyl having up to four carbon atoms, alkoxy and thioalkoxy each having up to three carbon atoms, trifluoromethyl and trifluoromethoxy.

3,888,989
COMPOSITION AND METHOD FOR TREATING VIRUS INFECTIONS

Joseph W. Blaszczak, 19 Dosoris Way, Glen Cove, N.Y. 11542

Continuation-in-part of Ser. Nos. 256,539, Feb. 6, 1963, abandoned, and Ser. No. 458,759, May 25, 1965, Pat. No. 3,479,335, and a continuation of Ser. No. 877,523, Nov. 17, 1969, abandoned. This application Aug. 9, 1972, Ser. No. 279,273

Int. Cl. A61k *27/00*

U.S. Cl. 424—280 **3 Claims**

3. A method of treating virus infections selected from the group consisting of the fowl pox virus, the virus causing infectious laryngotracheitis in animals, the virus causing infectious bronchitis in animals, the virus causing Newcastle disease, the virus causing hog cholera, the virus causing canine distemper, and the influenza A virus animals, said method consisting in administering to said infected animal the reaction product of ascorbic acid and formaldehyde at a dosage effective to treat said virus infections, said reaction product being produced by heating and melting an aqueous solution of ascorbic acid with formaldehyde at a temperature between 80°C. and 120°C. and at an acid pH, the formaldehyde being present in a molar ratio exceeding 1 with respect to said ascorbic acid, and continuing said heating until excess formaldehyde is removed from the reaction mixture by evaporation.

3,888,990
MEDICAMENTS CONTAINING EPICATECHIN-2-SULFONIC ACIDS AND SALTS THEREOF

Pierre Courbat, and Andre Valenza, both of Nyon, Switzerland, assignors to ZYMA S.A., Nyon, Vaud, Switzerland

Continuation-in-part of Ser. No. 117,718, Feb. 22, 1971, abandoned. This application Sept. 6, 1973, Ser. No. 394,627

Claims priority, application Switzerland, Mar. 13, 1970, 3809/70

Int. Cl. A61k *27/00*

U.S. Cl. 424—283 **2 Claims**

1. A medicament against vascular disease and conjunctive tissue disorders, comprising

a pharmaceutically effective amount of a compound selected from the group consisting of (+)-epicatechin-2-sulfonic acid, (−)-epicatechin-2-sulfonic acid, (+)-epicatechin-2-sulfonic acid and a pharmaceutically acceptable salt thereof, and

a pharmaceutically acceptable carrier.

3,888,991
METHOD AND COMPOSITION FOR LOWERING INTRAOCULAR PRESSURE

Wilbur Lippmann, Montreal, Quebec, Canada, assignor to Ayerst McKenna and Harrison Ltd., Montreal, Canada

Continuation-in-part of Ser. No. 392,898, Aug. 30, 1973, abandoned, which is a continuation of Ser. No. 198,993, Nov. 15, 1971, abandoned, which is a continuation of Ser. No. 878,581, Nov. 20, 1969, abandoned. This application Nov. 4, 1974, Ser. No. 520,397

Int. Cl. A61k *27/00*

U.S. Cl. 424—285 **6 Claims**

1. The method of lowering intraocular pressure which comprises administering topically to the eye of a person suffering from an open-angle glaucomatous condition an intraocular pressure lowering amount of an isotonic aqueous solution containing about 1 to 10 milligrams per milliliter, as the base, of epinephrine or an acid addition salt of epinephrine with a pharmaceutically acceptable acid, in conjunction with a potentiating amount of 1 to 5 milligrams per milliliter, as the base, of N,3,3-trimethyl-1-phenyl-1-phthalanpropylamine or of its acid addition salt with a pharmaceutically acceptable acid.

3,888,992
NEMATOCIDAL N-POLYHALOVINYLTHIOFORMAMIDES

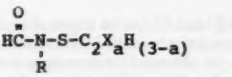
Melancthon S. Brown, deceased, late of Berkeley, Calif. (Gustave Kohn, administrator), assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 253,643, May 15, 1972, Pat. No. 3,771,991, which is a division of Ser. No. 33,878, April 29, 1970, Pat. No. 3,697,571, which is a continuation-in-part of Ser. Nos. 810,368, March 25, 1969, abandoned, and Ser. No. 748,642, June 30, 1968, abandoned, said Ser. No. 810,368, is a continuation-in-part of Ser. No. 748,642, , and Ser. No. 704,555, Feb. 12, 1968, abandoned, said Ser. No. 748,642, is a continuation-in-part of Ser. No. 704,555,. This application Aug. 6, 1973, Ser. No. 386,270

Int. Cl. A01n *9/12*

U.S. Cl. 424—298 **10 Claims**

1. A nematocidal composition comprising a nematocidally effective amount of a polyhalovinylthioformamide of the formula



wherein R is hydrogen or alkyl of one to four carbon atoms, X is halogen of atomic number 17 to 35 and *a* is 2 or 3, and an inert carrier.

3,888,993
PHARMACEUTICAL COMPOSITION CONTAINING AMINO ALCOHOLS DERIVED FROM ORTHO-TRANS-HYDROXYCINNAMIC ACIDS, THEIR ESTERS AND THEIR AMIDES

Eugene Boschetti, Venissieux; Darius Molho, Boulogne-Sur-Seine, and Louis Fontaine, Lyon, all of France, assignors to Lipha, Lyonnaise Industrielle Pharmaceutique, Lyon, France

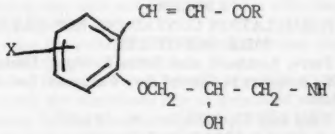
Division of Ser. No. 241,381, April 5, 1972, Pat. No. 3,828,095. This application May 3, 1973, Ser. No. 356,786

Claims priority, application France, Apr. 9, 1971, 71.12.668

Int. Cl. A61k *27/00*

U.S. Cl. 424—309 **14 Claims**

1. A pharmaceutical composition for the treatment of chest angina and tachyarrhythmia, comprising, as active principle, an amount sufficient to block beta-sympathetic receptors of a compound of formula



in which R is a member of the group consisting of an hydroxy, and lower alkoxy;

R′ is a lower alkyl radical; and

X is hydrogen or bromine, and a physiologically acceptable pharmaceutical carrier.

3,888,994

CHOLERETIC MEDICINE

Josef Wagner, Grunwald, and Helmut Grill, Vaterstetten, both of Germany, assignors to Chemisch-Pharmazeutische Fabrik Adolf Klinge & Co., Munich, Germany

Filed Oct. 23, 1973, Ser. No. 408,945

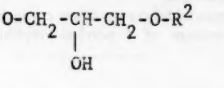
Claims priority, application Germany, Oct. 26, 1972, 2252637

Int. Cl.[2] A61K *27/00*

U.S. Cl. 424—342 1 Claim

1. A method of producing a choleretic effect in a patient in need of said therapy comprising:

orally administering, in unit dosage form, to a patient in need of said therapy, a choleretic-effective non-toxic amount of a 1,3-dialkyl glycerine ether of the formula



in which R^1 and R^2 can be identical or different and represent straight or branched alkyl radicals with 1–8 C atoms which are saturated or contain a double bond and are optionally substituted by a lower alkoxy radical, or represent cycloalkyl radicals with 5–6 C atoms, and a pharmaceutical diluent.

3,888,995

FATTY ALCOHOL-PROPYLENE GLYCOL VEHICLE

Martin Katz, Atherton, Calif., and Herbert M. Neiman, Philadelphia, Pa., assignors to Syntex Corporation, Panama

Division of Ser. No. 745,989, July 19, 1968, Pat. No. 3,592,930. This application Mar. 3, 1971, Ser. No. 120,691. The portion of the term of this patent subsequent to July 13, 1988, has been disclaimed.

Int. Cl. N61k *9/06*

U.S. Cl. 424—358 11 Claims

1. A substantially anhydrous pharmaceutical vehicle of cream-like consistency consisting essentially of

a. from 20 to 35 parts by weight saturated fatty alcohol having from 16 to 24 carbon atoms,

b. from 55 to 80 parts by weight of a glycol solvent selected from the group consisting of 1,2-propylenediol, 1,3-propylenediol, dipropylene glycol, and mixtures thereof,

c. from 0 to 15 parts by weight of compatible plasticizer,

d. from 0 to 15 parts by weight of compatible coupling agent,

e. from 0 to 20 parts by weight of penetrant, and

f. from 0 to 3 weight percent water, the composition being substantially free from petrolatum, mineral oil, monohydric fatty alcohols and fatty acids which are unsaturated, and monohydric alcohols, fatty acids and fatty amides which have less than 16 carbon atoms, said vehicle being particularly suitable for providing an occlusive film for releasing topically active cortico-steroids, and for distributing medication over the skin surface and maintaining it there until beneficial action occurs.

3,888,996

BAKERY FORMULATION CONTAINING NON-FAT DRY MILK SUBSTITUTE

Eugene J. Turro, Lombard, and Endre F. Sipos, Elmhurst, both of Ill., assignors to Central Soya Company, Inc., Fort Wayne, Ind.

Filed July 23, 1973, Ser. No. 381,857

Int. Cl. A21d *2/36, 2/26, 2/22*

U.S. Cl. 426—62 1 Claim

1. In a bread formulation where flour, water, sugar, shortening and yeast or chemical leavening are augmented by about 1.5 percent to about 3 percent of non-fat dry milk, the improvement comprising the substitution for at least a part of the non-fat dry milk of an equivalent weight of a mixture consisting essentially of 87–89 percent soy flour characterized by a Nitrogen Solubility Index of not less than about 66 percent, 5–7 percent soy protein isolate, 0.25–0.5 percent ascorbic acid with the remainder of said formulation being edible calcium salts with at least 50 percent of said salts being calcium lactate.

3,888,997

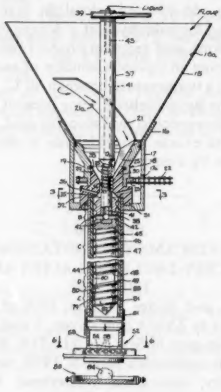
METHOD AND APPARATUS FOR PROCESSING DOUGH

Raul Guibert, c/o Hotel Shoreham 33 W. 55th St., New York, N.Y. 10019

Filed May 9, 1973, Ser. No. 358,483

Int. Cl. A21c *1/00*

U.S. Cl. 426—27 16 Claims



1. In a method of processing dough from flour and a dough-forming solution, the steps of providing a vertical tubular chamber, feeding the flour into said chamber and centrifugally hurling it against the inner wall of the chamber thereby depositing the flour in a thin film upon the inner wall of the chamber, feeding said solution into said chamber and centrifugally hurling it against the thin film of flour thereby intimately admixing it with said film to form a pasty film on said inner wall, directing said pasty film downwardly along said inner wall along a helical path, scraping said pasty film from said inner wall to form a downwardly extending helical ribbon, and subjecting said ribbon to a kneading action as the ribbon travels downwardly.

3,888,998

BEVERAGE CARBONATION

Ronald Lee Sampson, Cincinnati, and David Denzil Whyte, Wyoming, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 200,849, Nov. 22, 1971, abandoned. This application Oct. 30, 1972, Ser. No. 302,149

Int. Cl. A23l *1/00*

U.S. Cl. 426—67 20 Claims

1. A process for carbonating a potable aqueous solution comprising contacting said solution with an effective amount of a porous crystalline zeolite material, said zeolite having adsorbed therein at least about 5% by weight of carbon dioxide, said contact taking place at a temperature below about 110°F and a pressure of at least about 1 atmosphere.

12. A composition for making a flavorful carbonated beverage from tap water or the like comprising a dry beverage mix and an amount effective to carbonate the beverage of a porous crystalline zeolite said porous crystalline zeolite material having adsorbed therein at least about 5% by weight carbon dioxide.

3,888,999

COFFEE PERCOLATOR PACKAGES AND METHOD

Gary V. Jones, Ramsey, N.J.; John A. Pereira, Pearl River, N.Y., and Warren C. Rehman, Montvale, N.J., assignors to General Foods Corporation, White Plains, N.Y.

Filed May 30, 1973, Ser. No. 365,305
Int. Cl. B65d *85/70*; A23f *1/08*
U.S. Cl. 426—77 4 Claims

1. In a process for making a circular percolator package for use in brewing coffee which comprises degassing roasted and ground coffee, compressing said coffee at a pressure between 8,000 and 13,000 p.s.i. for a sufficient period of time to form a self-sustaining, annular tablet which is capable of releasing at least 10 percent more extractable solids than an equivalent charge of uncompressed coffee but insufficient to express undesirable lipids, and enclosing said annular tablet in a porous filter material by means of an inner seal extending around and spaced apart from the inner circumference of the annular tablet and an outer seal extending around and spaced apart from the outer circumference of the annular tablet, said material having a pore size between 0.01 and 0.1 inch and said enclosure having a volumetric capacity at least 30 percent greater than the volume of the enclosed coffee tablet, the improvement comprising forming at least one incompletely sealed area in the inner or outer seals, the incompletely sealed area forming a passageway between the interior and exterior of the percolator package.

4. An annular shaped percolator package comprising a compressed annular shaped coffee tablet enclosed within a filter material by means of an inner heat seal extending around and spaced apart from the inner circumference of the annular tablet and an outer heat seal extending around and spaced apart from the outer circumference of the annular tablet, said inner seal being incomplete in at least one location, the incompletely sealed area forming a passageway between the interior and the exterior of the percolator package.

3,889,000

PERCOLATOR PACKAGES AND PROCESS THEREFOR

Charles J. Cante, Ossining, and John R. Frost, Yonkers, both of N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Filed May 30, 1973, Ser. No. 365,306
Int. Cl. A23f *1/08*, *19/14*
U.S. Cl. 426—84 10 Claims

1. In a coffee percolator package having a compressed tablet of roast and ground coffee said tablet being enclosed by a filter material having a porosity conforming to between about an 8 and 60 U.S. mesh screen, the improvement comprising said package containing an amount of linear organosiliconoxide polymer sufficient to reduce the incidence of superheating when brewing coffee from said package.

3,889,001

HYDROLYZED PROTEIN IN NON-DAIRY WHIPPED TOPPING

Norma F. Buide, New York; Joaquin C. Lugay, Thornwood, and Rex J. Sims, Pleasantville, all of N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Filed Aug. 20, 1973, Ser. No. 389,842
Int. Cl. A23g *3/00*, *5/00*
U.S. Cl. 426—565 10 Claims

1. A whippable oil-in-water emulsion composition comprising:

a. 10 to 30 percent of a fat having a normally high solids content and a rapid melt down to a low solids content at body temperature;
b. 20 to 30 percent carbohydrate;
c. 40 to 60 percent water;
d. 0.5 to 2.0 percent emulsifier;
e. 0.05 to 2.0 percent stabilizer; and
f. an amount, less than 0.5 percent of a protein hydrolysate having an average molecular weight of from about 300 to 15,000 which is effective to provide the ability of the composition to be whipped to an overrun of over 200 percent and also provide freeze-thaw stability.

3,889,002

SPOONABLE FROZEN GELATIN DESSERT CONCENTRATE

Adolph Scott Clausi, Cos Cob, Conn.; Martin Glicksman, Valley Cottages, and Elizabeth Farkas, Yonkers, both of N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Filed June 8, 1973, Ser. No. 368,150
Int. Cl. A23f *1/04*, *1/06*
U.S. Cl. 426—576 11 Claims

1. A method of producing a thick, stirrable gelatin-based suspension which can be readily cleaved with a spoon for use as a gelatin dessert concentrate that is readily dispersible and soluble in hot tap water and quick-setting on subsequent refrigeration to produce a convenient-to-serve gelatin dessert, which method comprises:

a. soaking gelatin in a polyhydric alcohol for an initial period of at least one hour to allow the gelatin to become discrete and swollen but prior to assuming a cohesive appearance, the gelatin and polyhydric alcohol being in a respective weight ratio of 5:1 to 1:3;
b. dry blending sucrose, food acid, flavoring and coloring and mixing these dry ingredients with the gelatin and polyhydric alcohol suspension to form a homogenous mixture;
c. allowing the homogenous mixture to stand for the purpose of equilibration.

3,889,003

BAKED PRODUCT AND PROCESS FOR PREPARING SAME

Maxine N. Yourman, 49 Potomac Ln., Sayville, N.Y. 11782

Filed June 25, 1973, Ser. No. 372,909
Int. Cl. A23c *9/00*
U.S. Cl. 426—580 6 Claims

1. The process of making a baked product consisting essentially of skim milk powder, egg white, egg yolk and dextrin comprising the steps of beating the whites of eggs which are separated from the yolks until they are stiff

gradually adding ice water and dextrin and sweetner to the whites while beating the whites
adding skim milk powder to the whites while they are being beaten
beating the yolks with dextrin and sweetner and flavoring until the yolks are thick
folding the egg mixture into the egg white mixture
pouring the ingredients into an ungreased pan, and
baking the composition at between 300°-325°F for between 50 and 60 minutes, the egg whites being in an amount sufficient to produce a rising type composition, the skim milk powder being in an amount sufficient to stabilize the egg white and hold them in the risen condition, and the dextrin being in a sufficient amount that when added to the egg white and baked, results in a baked product that rises and stays risen so that it has bulk and consistency.

3,889,004

HIGH PRESSURE INJECTION OF A FATTY IN AQUEOUS PHASE

Heinrich Gottlieb Schmidt, Wedel, Holstein; Kunc Gustav Strauss, Hamburg, and Josef Tennikat, Delmenhorst, all of Germany, assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 292,192, Sept. 25, 1972, abandoned, which is a continuation-in-part of Ser. No. 129,776, March 3, 1971, abandoned. This application Dec. 20, 1973, Ser. No. 427,004

Int. Cl. A23d *3/02*

U.S. Cl. 426—188 13 Claims

1. A process for preparing an aqueous fatty emulsion in which a first liquid is injected through a nozzle into a stream of a second liquid flowing at between about 2 and about 50 cms/sec per nozzle through and filling a pipe with, immediately before injection, a pressure difference between said first and said second liquid of at least 100 atmospheres and a pressure in said second liquid of at least 0.3 atmospheres, said first and second liquids consisting essentially of a fatty and an aqueous phase.

3,889,005

EMULSIFIER SYSTEM

Klaus-Rudiger Brammer, and Theophil Wieske, Hamburg, both of Germany, assignors to Lever Brothers Company, New York, N.Y.

Filed Sept. 14, 1973, Ser. No. 397,505

Claims priority, application Luxembourg, Sept. 15, 1972, 66093

Int. Cl. A23d *3/00*

U.S. Cl. 426—189 8 Claims

1. An improved edible emulsion, which is a low calorie fat spread of the water-in-oil type, having improved microbiological stability and organoleptic properties consisting essentially of 30–60 percent of a fatty phase, an aqueous phase and an improved emulsifier system therefor, said improved emulsifier system consisting essentially of saturated fatty acid partial glycerides and unsaturated fatty acid partial glycerides, the weight ratio of said unsaturated fatty acid partial glycerides to said saturated fatty acid partial glycerides being about 1.5–1 to 10–1 and wherein said saturated fatty acid partial glycerides have a dominant proportion of stearic acid partial glyceride.

3,889,006

AN ANIMAL FEED OF HIGH DIGESTIBILITY

Taro Nagasawa, Tokyo; Joji Ono, Chiba; Tutomu Kudo, Kawasaki, and Yoshitugu Harada, Tokyo, all of Japan, assignors to Morinaga Milk Industry Co. Ltd., Japan

Division of Ser. No. 142,530, May 21, 1971. This application July 2, 1973, Ser. No. 375,898

Int. Cl. A23k *1/00*

U.S. Cl. 426—656 2 Claims

1. A foodstuff of high digestibility containing a yeast mass of cells obtained by (1) alkaline treating (2) precipitating and (3) drying of yeast cells which are at least partially deprived of cell wall integrity and at least partially devoid of mannan, said yeast cells being selected from the group consisting of hydrocarbon assimilating mutants of Candida MA7002, M7005, M7006, M7007 and M7010.

3,889,007

AQUATIC ANIMAL FOOD COMPOSITION

Gordon Gunter, and Amaraneni Venkataramaiah, both of Ocean Springs, Miss., assignors to Ocean Food Inc., White Stone, Va.

Filed Jan. 26, 1973, Ser. No. 327,232

Int. Cl. A23k *1/00*

U.S. Cl. 426—74 20 Claims

1. An aquatic animal food comprising: fish meal, a fish extract in an amount sufficient to impart a fish flavor to said meal, sea water in an amount of 150–400 parts per 1,000 parts of fish meal, and an organic binder, non-toxic to marine life, in an amount sufficient to form particles capable of withstanding disintegration or leaching from sea water of varying natural salinity and a temperature range of 10°–33°C. for several days.

3,889,008

FIXED VOLATILE FLAVORS AND METHOD FOR MAKING SAME

William A. Mitchell, Lincoln Park, N.J.; Howard D. Stahl, Hartsdale, and William C. Seidel, Monsey, both of N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Continuation-in-part of Ser. No. 36,666, May 12, 1970, Pat. No. 3,787,592. This application Sept. 20, 1973, Ser. No. 399,201The portion of the term of this patent subsequent to Jan. 22, 1991, has been disclaimed.

Int. Cl. A23l *1/26*

U.S. Cl. 426—534 16 Claims

1. A method for producing a solid flavoring composition containing low levels of volatile flavoring compounds comprising the steps of:

a. forming a supersaturated aqueous solution of sucrose, said solution also containing a volatile flavoring compound,

b. crystallizing sucrose from the solution to fix a portion of the volatile flavoring compound within individual sucrose crystals at a level of less than about 0.5% by weight of the crystal, and thereafter,

c. drying the crystals.

3,889,009

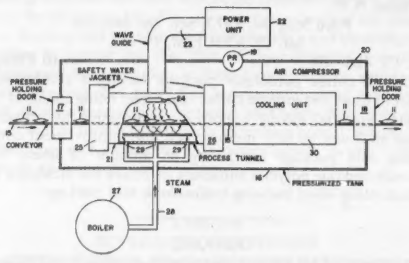
METHOD FOR CONTINUOUS ELECTROMAGNETIC STERILIZATION OF FOOD IN A PRESSURE ZONE

Samuel P. Lipoma, 825 - 19th Pl., Delano, Calif. 93215

Continuation of Ser. No. 276,579, July 31, 1972, abandoned. This application Sept. 11, 1974, Ser. No. 505,138

Int. Cl. A23l *3/04*

U.S. Cl. 426—234 4 Claims



1. A method for sterilizing food at high temperatures comprising the steps of:

conveying the food on conveying means through pressure-retaining means at the entrance to a pressure zone defined by a tank and continuously through the pressure zone and conducting the sterilizing process there under pressure above atmospheric,

conducting said food on the conveying means through a sterilizing tunnel contained fully within the pressure zone and separate from the tank defining the pressure zone whereby dissipation of heat in the tank walls can be avoided and heat energy confined to the tunnel interior, while keeping the tunnel under the same pressure as applies to the later process steps carried on in said pressure zone, and also whereby flexibility is obtained as to the time of sealing the food in a container, said tunnel having an entrance and an exit with said conveyor means passing through said tunnel via said entrance and exit,

subjecting said food to electromagnetic energy emitted within said sterilizing tunnel and thereby sterilizing the food,

cooling the food beyond said sterilizing tunnel and within said pressure zone in a cooling unit separate from and fully within the tank defining the pressure zone and while still under said pressure to a temperature at least below the boiling point of water at atmospheric pressure, and then conveying the food on the conveying means through pressure-retaining means at the outlet from the pressure zone and wherein the food is sealed in the container prior to the time the food is conveyed through the pressure-retaining means at the outlet from the pressure zone.

3,889,010
PROCESS FOR THE PREPARATION OF A PROTEIN FOOD PRODUCT

Anton H. J. Brouwer, Velp (Gld.), Netherlands, assignor to Akzo N.V., Arnhem, Netherlands

Filed Oct. 26, 1972, Ser. No. 300,975
Int. Cl. A23j *3/00*
U.S. Cl. 426—276 **12 Claims**

1. A process for the preparation of a protein containing food product having a fibrous, cohesive texture, which comprises dissolving an edible protein containing material in an aqueous liquid, foaming said protein-containing liquid so that the foam contains up to 50% by volume of protein containing liquid, extruding the foamed protein-containing liquid into a non-toxic coagulant, drawing said foamed protein material as it coagulates and drying the protein material.

3,889,011
FAT PRODUCTS

Colin Barrington Read, Gravesend, England, assignor to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 164,442, July 20, 1971, abandoned. This application Sept. 4, 1973, Ser. No. 393,864
Claims priority, application United Kingdom, July 23, 1970, 35874/70
Int. Cl. A03b *1/00*
U.S. Cl. 426—604 **6 Claims**

1. A process for producing margarine having improved spreading characteristics which comprises:

i. preparing a fat phase by performing in either order the steps of:

a. corandomising at a temperature of from 50° to 100°C a blend consisting essentially of 25–65 wt % of a palmitic fat with 75–35 wt % of a C_{16}-C_{18} vegetable oil in the substantial absence of water and in the presence of an effective amount of an alkali metal catalyst; and

b. partially hardening at least one of the components of the blend in the presence of an effective amount of a metal hydrogenation catalyst under isomerisation conditions, and continuing the said steps until the combined fatty acid content of the glycerides of the blend consists essentially of at least 3% trans acid and at most 35% saturated fatty acid, of which palmitic acid predominates, these amounts being by weight of the total combined fatty acid content, and its dilatation value at 20°C is at least 275 and at 35°C at most 90;

ii. incorporating into the fat phase an aqueous phase including flavours and an effective amount of a water-in-oil eumlsifier at an elevated temperature at which both phases are liquid;

iii. emulsifying the phases to form a water-in-oil emulsion; and

iv. passing said emulsion successively through a scraped surface heat exchanger and a scraped surface mixer in which the emulsion is chilled and tempered to crystallise at least part of the fat phase.

3,889,012
METHOD OF MANUFACTURING TWISTED PASTRY ARTICLES

Jacques Riviere, Reims, and Raymond Simon, Soisy-sur-Seine, both of France, assignors to Lu, Brun & Associes S.A., Athis-Mons, France

Filed Mar. 7, 1973, Ser. No. 338,743
Claims priority, application France, Mar. 10, 1972, 72.08519
Int. Cl. B66c *17/08;* **B65g** *27/00;* **A21b** *1/42*
U.S. Cl. 426—500 **4 Claims**

1. A method of manufacturing articles in the shape of twisted bars, from a strip of pastry or like material, comprising:

a. cutting the strip transversely into successive ribbons;

b. gripping each ribbon transversely thereto at several points spaced along its length, the extreme gripped portions corresponding to the two terminal parts of the ribbon;

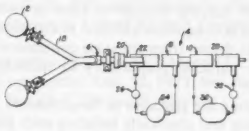
c. twisting a portion of the strip about the longitudinal axis of the strip between adjacent gripped portions, to form a twisted part, one twisted part being formed between each pair of gripped portions;

d, flattening the twisted part so that they do not become untwisted when each ribbon is liberated from the gripping action, each ribbon then being in the form of a bar with flat parts separated by at least one twisted part.

3,889,013
METHOD FOR MAKING SKINLESS FOOD PRODUCTS

Rex E. Moule, 2404 S. Patrick Dr., Indialantic, Fla. 32903

Continuation of Ser. No. 124,442, March 15, 1971, abandoned, which is a division of Ser. Nos. 674,309, Oct. 10, 1967, abandoned, and Ser. No. 155,271, June 21, 1971, abandoned. This application Mar. 21, 1973, Ser. No. 343,354
Int. Cl. A22c *11/00*
U.S. Cl. 426—513 **1 Claim**



1. A method of continuously making a skinless sausage food product from a sausage food mixture comprising the steps of: ejecting the sausage food mixture from a pressurized supply tank into a pressurizing and metering pump;

injecting the untreated sausage food mixture under a pressure from 150 – 300 pounds per square inch into the inlet end of a thermally conductive conduit under pressure from a pressurizing and metering pump;

moving the sausage food mixture at a high rate of speed through the thermally conductive conduit;

passing the food mixture at a high rate of speed through the heated first portion;

simultaneously heating a first portion of the thermally conductive conduit adjacent the inlet end of said conduit to a temperature between 200° to 500° Fahrenheit, thereby heating a surface portion of the sausage food mixture to a temperature that liquifies fatty substances on a surface and that unites into a coherent mass other ingredients in a surface portion, while keeping continuous pressure on the food mixture to fill voids with the mixture itself;

cooling a second portion of said conduit adjacent said heated portion and axially in line with the flow of said food mixture to a temperature between 33° and 50° Fahrenheit, thereby cooling the sausage food mixture before

heat penetrates inward beyond the surface portion, whereby the surface portion of the food mixture is cooled to solidify the outer thickness into a casing for the food product;

ejecting the food mixture from the outlet end of said conduit whereby a sausage food mixture is continuously transformed into a skinless food product.

3,889,014

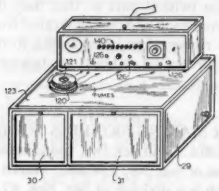
AUTOMATIC ELECTRON MICROSCOPY TISSUE PROCESSOR METHOD

Thomas D. Kinney, and John E. P. Pickett, both of Durham, N.C., assignors to Triangle Biomedical Equipment, Inc., Durham, N.C.

Division of Ser. No. 228,115, Feb. 22, 1972, Pat. No. 3,771,490. This application Aug. 23, 1973, Ser. No. 390,950The portion of the term of this patent subsequent to Nov. 13, 1990, has been disclaimed.

Int. Cl. A01n *1/00*

U.S. Cl. 427–4 **3 Claims**



1. The method of processing in a closed, automatic processor wherein a plurality of individual electron microscopy size particles of the character of having at least one dimension no greater than one millimeter are separately contained while being bathed simultaneously according to a predetermined program for varying lengths of time in successive selected aqueous and non-aqueous electron microscopy tissue processing solutions drawn from separate containers thereof so as to prepare the particles preparatory to embedding, comprising the steps of:

a. separating the particles to be processed into groups;

b. installing and physically isolating each group in a respective uniform tissue receptacle which is porous to the extent of having for each solution at least some porous portion permeable thereto;

c. placing a plurality of such receptacles in an open top processing chamber having a removable top cover, an entry-discharge port in the bottom thereof and a vent hole proximate the top cover and replacing the cover;

d. in a predetermined time sequence and for each solution cycle:

1. withdrawing from one of said solution containers into a controllable metering means located externally of said processing chamber a metered amount of said solution used in such cycle;

2. connecting said external metering means holding said metered solution to said port and with said port open forcing said metered amount of said solution from said external metering means into said chamber through said port and then closing said port;

3. retaining the said metered amount of solution for a predetermined amount of time in said chamber;

4. opening said port and while blocking return of the used solution to said external metering means allowing the used solution to drain from said chamber through said port; and

5. during each such sequence holding the receptacles successively submerged in each respective solution and in a depth of solution determined solely by said metered amount thereby allowing each of the selected solutions to be exchanged with each group of particles by penetration and drainage through said pores while maintaining said system closed, a fixed amount of solution in said chamber and each said group physically isolated from the other.

3,889,015

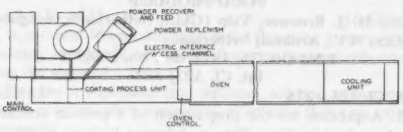
COATING METHOD WITH CLEANING

William P. English, Bridgeport, Conn., assignor to Electrostatic Equipment Corporation, New Haven, Conn.

Filed May 24, 1972, Ser. No. 256,294

Int. Cl. B05b *5/02*; **B44d** *1/095*

U.S. Cl. 427—21 **7 Claims**



1. A method for the production of a coating of resinous material upon only a portion of a workpiece, comprising the steps of:

a. producing a cloud of electrostatically charged solid particles of resinous material;

b. exposing said workpiece to said charged particles with said workpiece charged effectively opposite thereto to cause a layer of particles to deposit thereon;

c. thereafter, contacting a particle-coated portion of said workpiece with a relatively resiliently deformable contact surface having a small open-cell construction, under conditions avoiding relative movement between elements of said workpiece portion and of said contact surface while in such contact, thereby lodging particles from said coated portion in the cells of said contact surface while avoiding substantial wiping action between said contact surface and said workpiece portion; and

d. thereafter, separating said contact surface and said workpiece with said particles lodged within the cells of said contact surface to thereby effect the removal of particles from said contacted portion.

3,889,016

METHOD OF MAKING A DIRECT CURRENT ELECTROLUMINESCENT DEVICE

Natalya Andreevna Vlasenko, ulitsa Entuziastov, 15, kv. 175; Alla Nikolaevna Gergel, ulitsa Krasnoarmeiskaya, 145, kv. 187, both of Kiev, and Andrei Antonovich Shkola, Belotserkovsky raion, selo Kozhenitskogo, Kievskaya Oblast, all of U.S.S.R.

Filed May 26, 1972, Ser. No. 257,347

Int. Cl. B44d *1/18*, *1/16*

U.S. Cl. 428—66 **3 Claims**

1. A method of making a direct-current electroluminescent device, in which an electroluminescent film is deposited onto a heated substrate covered with an optically transparent electrode, comprising vacuum evaporating zinc sulphide doped with manganese, copper, and chlorine from a first evaporator at a temperature between 1,050°C–1,250°C and simultaneously vacuum evaporating metallic zinc from a second evaporator at a temperature between 360°C–400°C, thereby enabling the desired concentration of zinc to be obtained in said film; and vacuum evaporating a metal onto said film to form an electrode on said film.

3,889,017

CHEMICAL FILMING SOLUTION AND PROCESS FOR PLATING THEREWITH

Helmut Franz, Oakmont, and David E. Lecoco, New Kensington, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Feb. 2, 1971, Ser. No. 111,904
Int. Cl. C03c *17/10;* **B44d** *1/02*
U.S. Cl. 427—160 **11 Claims**

1. In the method of forming metal based films on nonmetallic substrates comprising the steps of sensitizing the substrate and then simultaneously contacting the substrate with a solution containing a salt of a metal selected from the group consisting of nickel, cobalt and iron and a solution containing a boron-containing reducing agent wherein bulk precipitation rapidly occurs in the solution mixture, thereby inactivating it and preventing full deposition of the metal on the substrate as a film the improvement comprising carrying out said simultaneous contacting in the presence of an effective amount of at least one monocarbonyl containing compound selected from the group consisting of linear alkyl ketones, saturated cyclic ketones, and condensation alcohols of linear alkyl ketones and saturated cyclic ketones to retard bulk precipitation and enhance film deposition.

9. A method of providing a transparent substrate with a transparent film having a metallic luster such substratefilm combination having a transparency or luminous transmittance of less than about 50 percent of that of the substrate alone comprising the steps of:

1. cleaning the substrate;
2. contacting the substrate with a solution comprising a compound containing a metal selected from the group consisting of tin and palladium whereby the substrate is sensitized;
3. washing away residue sensitizing solution from step 2;
4. simultaneously contacting the substrate with a metal containing solution and a reducing solution for the contemplated metal so that the solutions mix,

the metal solution comprises a salt of a metal selected from the group consisting of nickel, cobalt and iron and a monocarbonyl containing compound selected from the group consisting of linear alkyl ketones, saturated cyclic ketones, and condensation alcohols of linear alkyl ketones and saturated cyclic ketones in an effective amount to retard bulk precipitation of metal, and

the reducing solution comprising an alkali metal borohydride and sufficient alkaline material so that the mixture has an initial ph upon contacting greater than 7;

5. washing away residue filming solution mixture from step 4; and
6. drying the filmed substrate.

3,889,018

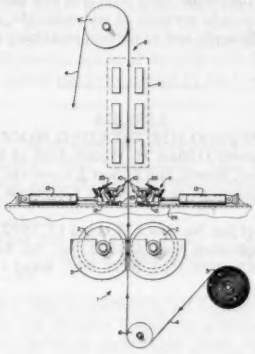
METHOD OF SIMULTANEOUSLY COATING THE OPPOSITE SIDES OF A PAPER WEB

Richard J. Quint, Dixfield, Maine, assignor to Ethyl Corporation, Richmond, Va.

Division of Ser. No. 341,928, March 16, 1973, which is a continuation of Ser. No. 82,475, Oct. 20, 1970, abandoned, which is a division of Ser. No. 703,924, Feb. 8, 1968. This application Aug. 1, 1973, Ser. No. 384,689
Int. Cl. B05c *11/02*
U.S. Cl. 427—209 **14 Claims**

1. The method of simultaneously coating the opposite sides of a paper web comprising the steps of:

a. applying a layer of coating material to the opposite sides of the web;
b. feeding said coated web along a predetermined path;
c. engaging said coated web, as it moves along said predetermined path, by a pair of flexible metering blades disposed and aligned on opposite sides of the web, each said blade extending freely at an acute angle relative to the plane of the coated web in the direction from which the coated web is approaching the the blades, each said blade having a generally flat beveled working face where it engages the coated web; and
d. simultaneously applying equal and opposed pressure against aligned opposite sides of the coated web over an



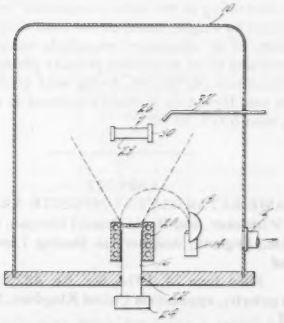
area defined by the width of the web and a distance along its length as it moves along said predetermined path by urging said blades toward each other with a force sufficient to establish and maintain at least a partially flush engagement of said working faces with the opposite sides of the coated web.

3,889,019

VAPOR RANDOMIZATION IN VACUUM DEPOSITION OF COATINGS

Sol S. Blecherman, Newington; Mitchell J. Bala, Hazardville; Dennis J. Evans, Rocky Hill, and Nicholas E. Ulion, Vernon, all of Conn., assignors to United Aircraft Corporation, East Hartford, Conn.

Continuation of Ser. No. 806,873, March 13, 1969, abandoned. This application Aug. 12, 1971, Ser. No. 171,292
Int. Cl. C23c *13/02, 13/04*
U.S. Cl. 427—251 **2 Claims**



1. A process of vacuum vapor depositing a protective metal coating on a metallic substrate comprising:

positioning a source of material to be vaporized within an evacuated enclosure;

positioning the substrate within the enclosure above said source in direct line-of-sight thereof such that vapor particles produced by heating said source material impinge on and coat line-of-sight portions of said substrate;

heating said source material to produce a vapor cloud of coating material moving generally line-of-sight from said source to said substrate and coating line-of-sight portions of the substrate;

introducing at low velocity an inert gas to increase the pressure in the enclosure to at least 2.0×10^{-4} mm Hg to decrease the mean free collision path of vapor cloud atoms to randomize their direction and cause coating of non-line-of-sight portions of said substrate, said pressure being sufficiently low to prevent sustaining a gas plasma discharge.

3,889,020

METHOD FOR TREATING WOOD

Joseph Amundsen; William H. Wetzel, both of Federal Way; Norma Naimy, Seattle, and Robert J. Goodwin, Puyallup, all of Wash., assignors to Reichhold Chemicals, Inc., White Plains, N.Y.

Continuation of Ser. No. 244,877, April 17, 1972, abandoned. This application Mar. 6, 1974, Ser. No. 448,543

Int. Cl. B05c *3/00;* **B27k** *3/08;* **B44d** *1/26*

U.S. Cl. 427—297 **12 Claims**

12. The method for the production of light colored wooden structures according to claim 1 wherein the amount of co-solvents, waxes, resins, decolorants, surfactants and inhibitors added ranges from about 0.01% to about 1% by weight.

3,889,021

METHOD OF MAKING TOP PLATES FOR RANGE

Shigeo Kuwayama, and Motohiko Yagi, both of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 24, 1972, Ser. No. 247,057

Claims priority, application Japan, Apr. 23, 1971, 46-26578

Int. Cl. C04b *41/06;* **C03c** *17/04;* **B32b** *17/06*

U.S. Cl. 427—376 **5 Claims**

1. A method of producing a top plate for a range consisting essentially of coating the surface of a crystalline glass plate with a layer of a suspension in a liquid medium of a mixture consisting essentially of (1) a powder of a crystallizable glass which after being crystallized has substantially the same thermal expansion coefficient as that of said crystalline glass plate or (2) a powder of a glass or ceramic having substantially the same thermal expansion coefficient as that of said crystalline glass plate; a powder of a bonding clay; and an inorganic adhesive containing as the main component from 0.5 to less than 2percent by weight, based on the total weight of the solid components, of an aluminum phosphate selected from the group consisting of an aluminum primary phosphate and aluminum chromium phosphate, drying said coated layer, and subjecting said layer to a burning treatment at a temperature of from about 600℃ to 900℃.

3,889,022

FLAME RETARDANT COMPOSITE ARTICLES

Kenneth Whittaker, and David Ronald Morgan, both of Sutton Coldfield, England, assignors to Dunlop Limited, London, England

Filed June 24, 1974, Ser. No. 482,584

Claims priority, application United Kingdom, May 29, 1973, 33663/73

Int. Cl. D03d *25/00;* **B32b** *5/18*

U.S. Cl. 428—262 **11 Claims**

1. A flame-retardant composite article having a core made from at least one combustible material, wherein said core is covered, at least in part, by a combination of

a. at least one flexible, intumescent, char-forming material; and

b. at least one textile fibrous layer, said combination forming at least one layer or zone.

3,889,023

SILICONE ELASTOMERS BONDED TO SOLID SUBSTRATES

Edwin P. Plueddemann, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Division of Ser. No. 320,375, Jan. 2, 1973, Pat. No. 3,794,612. This application Oct. 4, 1973, Ser. No. 403,685

Int. Cl. B32b *15/08;* **C03c** *17/30*

U.S. Cl. 428—429 **5 Claims**

1. A composite article comprising a solid substrate having bonded thereto a cured silicone rubber composition comprising (a) 100 parts by weight of a mixture consisting essentially of an organopolysiloxane gum of the unit formula $R_nSiO_{(4-n)/2}$ in which R is selected from the group consisting of methyl, vinyl, phenyl and 3,3,3-trifluoropropyl radicals and n has an average value of from 1.98 to 2.01 inclusive, a reinforcing silica and an organoperoxide vulcanizing agent; and (b) from about 2 to 10 parts by weight of diallylphthalate.

3,889,024

METHOD OF CONTROLLING THE MIGRATION OF RESIN COMPOSITIONS IN THE MANUFACTURE OF POROUS MATERIALS

Arthur H. Drelich, Plainfield, and George J. Lukacs, Perth Amboy, both of N.J., assignors to Johnson & Johnson, New Brunswick, N.J.

Filed Feb. 1, 1973, Ser. No. 328,555

Int. Cl. B44d *1/44*

U.S. Cl. 427-243 **11 Claims**

1. A method of applying a stable aqueous resin composition to porous or absorbent materials and controlling the migration thereon which comprises: applying to porous or absorbent materials a stable, aqueous resin composition comprising from about 0.1 percent to about 60 percent by weight on a solids basis of a synthetic resin and from about 0.01 percent by weight to about 6 percent by weight, based on the weight of the synthetic resin, of an aluminum chlorhydroxide Werner type complex migration control agent selected from the group consisting of: (a) aluminum chlorhydroxides; (b) reaction products of aluminum chlorhydroxide and polyhydroxy compounds; (c) reaction products of aluminum chlorhydroxide and monocarboxylic acids; (d) and mixtures thereof; and substantially immediately diluting said aqueous resin composition to substantially immediately destroy the stability thereof and coagulate said resin whereby the migration of said resin on said porous or absorbent materials is controlled.

3,889,025

PROTECTIVE COATINGS

Donald J. Peterson, Springfield Twsp., Hamilton City, Ohio, assignor to The Procter & Gamble Company, Ohio

Division of Ser. No. 208,024, Dec. 3, 1971, Pat. No. 3,839,502, which is a continuation-in-part of Ser. No. 158,527, June 30, 1971, abandoned. This application Mar. 27, 1974, Ser. No. 455,466

Int. Cl. B44d *1/26*

U.S. Cl. 428—413 **9 Claims**

4. A process according to claim 1 wherein the organotin compound is applied at a rate from about 0.01 g. to about 10 g. per square meter of surface area of the wood being treated.

3,889,026

HEAT-REFLECTING PANE

Rolf Groth, Witten, Germany, assignor to BFG Glassgroup, Paris, France

Filed Nov. 5, 1973, Ser. No. 412,985

Claims priority, application Germany, Nov. 17, 1972, 2256441

Int. Cl. B32b *17/06, 1/04*

U.S. Cl. 428—34 **11 Claims**

1. Heat-reflecting pane consisting essentially of a transparent layer support, a light-transmitting silver layer applied to

the transparent layer support, and a dielectric layer selected from the group consisting of zinc sulfide, cerium dioxide, titanium oxide and bismuth oxide that is absorption-free or at least of low absorption for visible light, disposed between the layer support and the silver layer and having a refractive index greater than 2, characterized in that, for the achievement of color neutrality both upon viewing from the inside and upon viewing from the outside, the thickness of the silver layer is between 140 and 240 A and the thickness of the dielectric layer is between 400 and 600 A.

7. A safety laminate pane comprising at least two panes joined by an adhesive interlayer, of which at least one is the heat-reflecting pane of claim **1** and is so disposed that the silver layer faces the adhesive interlayer.

10. A double-glazing unit com., rising at least two panes in spaced apart relationship, of which at least one is the heat-reflecting pane of claim **1** whose coated side faces the gap between the panes.

3,889,027

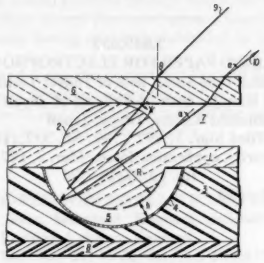
RETROREFLECTIVE FILM

Michael L. White, Morrisville, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 238,046, March 27, 1972, abandoned. This application Apr. 12, 1974, Ser. No. 460,638

Int. Cl. B44f *1/02*

U.S. Cl. 428—34 **4 Claims**



1. A retroreflective laminate comprising a first film having hemispherically formed depressions of uniform size and shape on one surface thereof, said surface having a reflective material deposited thereon, a second optically transparent film with each surface being so fashioned as to form matched and opposed substantially hemispherical projections of uniform size and shape from each surface of said film, where said projections have an identical center-to-center spacing but a smaller radius than that of the hemipsherical depressions of the first film, the first and second films being arranged so that the substantially hemispherical projections on one surface of the second film are matched concentrically with the hemispherical depressions of the first film to leave a space therebetween, and a third optically clear overlay film, disposed over the substantially hemispherical projections on the other surface of the second film, said overlay film making tangential contact with said projections to leave a space therebetween, the laminate being bonded together discontinuously over about 20 percent or less of the total area of the laminate to minimize optical inactivity caused by the bonding process.

2. A retroreflective laminate comprising a first film having hemispherically formed depressions of uniform size and shape on one surface thereof, said surface having a reflective material deposited thereon, a second optically transparent film having substantially hemispherical projections of uniform size and shape formed on one surface of said film, where said projections have an identical center-to-center spacing but a smaller radius than that of the hemispherical depressions of the first film, the first and second films being arranged so that the substantially hemispherical projections of the second film are matched concentrically with the hemispherical depressions of the first film to leave a space therebetween, the other surface of the second film forming an outer surface of said laminate, the laminate being bonded together discontinuously over about 20 percent or less of the total area of the laminate to minimize optical inactivity caused by the bonding process.

3,889,028

NON-WOVEN MATERIALS

Hermann Hosterey, Bad Mingolsheim; Hans Horst Moller, Keimen, and Ernst Raabe, Bad Mingolsheim, all of Germany, assignors to Imperial Chemical Industries Limited, London, England

Filed July 18, 1972, Ser. No. 272,841

Int. Cl. D04h *11/08*

U.S. Cl. 428—88 **17 Claims**

1. A textile material comprising a base fabric formed from a non-woven web having a loop-pile surface in which the fibres in the loops extend at angles of 45° to 90° to the plane of the base fabric, said fibres being integral with the base fabric and derived therefrom wherein at least 5 percent of the fibres in both the base fabric and the pile are composite fibres each formed of at least two fibre-forming synthetic polymer components arranged in distinct zones across the cross-section of the fibre, at least one of said components being potentially adhesive under conditions which leave the remainder of the components unaffected and occupying at least part of the outer surface of the composite fibre, the structure being bonded by the potentially adhesive components of said composite fibres at a multiplicity of points between contiguous fibres in both the base and the loop-pile.

3,889,029

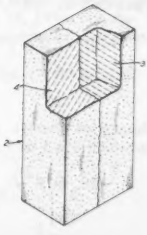
LADLE BRICK FOR LINING HIGH TEMPERATURE VESSELS

Leroy A. Keller, Sarver, Pa., assignor to Freeport Brick Company, Freeport, Pa.

Filed Nov. 9, 1973, Ser. No. 414,314

Int. Cl.² B32B *13/04*

U.S. Cl. 428—212 **6 Claims**



1. A fired refractory brick for lining a vessel for molten metal, the brick having a vessel-engaging face and an opposite face for engagement by molten metal, the brick being formed from two different compositions integrally united between said faces, the composition of the portion of the brick with said vessel-engaging face being at least one inch thick and essentially a blend of refractory bond clay and calcined fireclay, and the composition of the portion of the brick with said metal-engaging face being essentially a blend of refractory bond clay and calcined high alumina material, whereby said

last-mentioned face has more resistance to corrosion and erosion by molten metal than said first-mentioned face, said blends having substantially the same coefficients of thermal expansion during firing of the brick, and said first-mentioned portion of the fired brick having the property of greater expansion than the other portion of the brick when the fired brick is heated above 2,400°F in use.

3,889,030

METHOD OF COATING GLASS ARTICLE AND IMPROVED COATED GLASSWARE PRODUCT

Roy S. Arrandale, Elmira; Wayne A. Walding, Horseheads, and Barney R. Daugherty, Elmira, all of N.Y., assignors to Dart Industries Inc., Los Angeles, Calif.

Filed Aug. 22, 1972, Ser. No. 282,824
Int. Cl. C03c *17/32;* **B32b** *17/10*
U.S. Cl. 428—215 **11 Claims**

8. Coated glassware article having improved durability and resistance to shattering comprising

a. a glass container

b. a first coating consisting essentially of a polymer of an ethylenically unsaturated carboxylic acid; and

c. a second coating consisting essentially of a homopolyer of an olefin said second coating being relatively thicker than said first coating.

3,889,031

COATED GLASS BOTTLES

Testujiro Tatsumi; Reiji Miyamoto, both of Chiba; Yutaka Matsui, Shizuoka; Seiji Kazama, Hyogo; Tadao Takemura, Nara, and Hikoyoshi Kanayama, Chiba, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka and Mitsui Polychemicals, Co., Ltd., Tokyo, both of, Japan

Filed Oct. 26, 1972, Ser. No. 301,245
Claims priority, application Japan, Nov. 24, 1971, 46-94362
Int. Cl. B41m *1/18;* **B44c** *3/02;* **B44d** *1/02*
U.S. Cl. 428-216 **7 Claims**

1. A glass bottle, the surface of which has been initially coated with an olefine copolymer containing repeating units of (a)

$$-CH_2-\underset{\displaystyle R^1}{\underset{|}{CH}}-,$$

wherein R^1 is hydrogen or lower alkyl, (b)

$$-CH_2-\underset{\displaystyle X^1}{\underset{|}{CR^2}}-,$$

wherein R^2 is hydrogen or methyl, and X^1 is —OH or $-COO(CH_2)_nOH$ in which n is 1 to 3 and (c)

$$-CH_2-\underset{\displaystyle X^2}{\underset{|}{CR^2}},$$

wherein R^2 has the same meaning as above and X^2 is $-OCOR^3$ or $-COOR^4$ in which R^3 and R^4 are lower alkyl, the total amount of the repeating units (b) and (c) in the copolymer being about 1 to about 50 mole percent, and the amount of the repeating unit (b) being about 50 to about 100 mole percent relative to the total amount of the repeating units (b) and (c), such copolymer showing a melt index of about 0.5 to about 1,000 g/10 min, and then subsequently coated with a polyisocyanate, a mixture of polyisocyanate and a polyol or a mixture of a polyisocyanate and a thermoplastic polyurethane.

3,889,032

FOAMED PLASTIC SHEET MATERIAL AND SYSTEM FOR ITS MANUFACTURE

Lester Max Koelsch, 219 Conestoga St., Windsor, Conn. 06095

Filed May 10, 1972, Ser. No. 251,944
Int. Cl. B32b *3/12*
U.S. Cl. 428—218 **4 Claims**

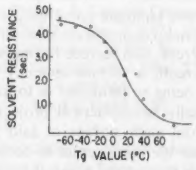
1. A foamed plastic sheet material of improved flexibility and reduced brittleness suited for use in place of fiber board material for book cover backings and the like consisting essentially of compressed polyvinyl aromatic plastic particles of closed-cell structure having a density of 5–15 pounds per cubic foot, said sheeting having planar exposed surfaces, a thickness of about 0.50–0.25 inch and a cross-section of uniform thickness containing a latticework comprised of a multiplicity of continuous, diagonally extending and intermeshed areas of cell-separating fused particle interface winding through the interior of the thin sheet wherein the areas of fused particle interface extend between the exposed surfaces of the sheet at sharp acute angles thereto and intersect to provide a hinge effect at their points of intersection, the closed and separated cells being elongated along the plane of the sheet and of a generally elliptical configuration, each exposed surface exhibiting a smooth, continuous uninterruped surface skin of said thermoplastic material, said sheet exhibiting a density gradiant across its thickness with the higher density being at both of said planar surfaces.

3,889,033

TRANSFERRING PAPER FOR ELECTROPHOTOGRAPHY

Hiroshi Tanaka; Ikuo Soma, both of Tokyo; Yoshikazu Ito, and Masayasu Kamijo, both of Fuji, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 1, 1973, Ser. No. 337,118
Claims priority, application Japan, Mar. 3, 1972, 47-22002
Int. Cl. D21h *1/28*
U.S. Cl. 428—323 **5 Claims**



1. A transferring paper for an electrophotographic process comprising developing an electric latent image with a liquid developer and transferring the image thus developed to the transferring paper which comprises a base paper and a coating layer produced by coating on the base paper a coating agent composed of 100–400 parts (as solid) of a polymer emulsion having a second order transition temperature of from −40°C to 25°C as a binder, and 100 parts of a white inorganic filler of a particle size of less than 3 microns and selected from the group consisting of clay, titanium oxide, calcium carbonate and barium sulfate in the amount of 2–10 g./m² (as a solid), carrier resistance of the resulting transferring surface being

1.5–15 sec., smoothness of the resulting transferring surface being 30–300 sec. and density being 0.75–100 g./cm³.

3,889,034

CHENILLE YARN AND METHOD OF MAKING SAME

Gerhard Lenards, and Walter Bahren, both of Rheydt, Germany, assignors to Kuhn Vierhaus & Cie. AG., Rheydt, Germany

Filed Jan. 18, 1974, Ser. No. 434,573
Claims priority, application Germany, Jan. 27, 1973, 2304049
Int. Cl. D02g 3/42; B44c 1/08
U.S. Cl. 428—372 4 Claims

1. A chenille yarn comprising:
a core filament;
a layer of adhesive surrounding said filament; and
a multiplicity of flocking fibers projecting from said filament and each having one end imbedded in said layer, said fibers being oriented generally parallel to one another and transverse to said filament from about the point of exit from said adhesive layer.

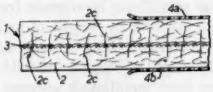
2. A method of making a chenille yarn comprising the steps of:
coating a core filament with an adhesive layer;
electrostatically charging a mass of flocking fibers;
passing the coated filament through said mass whereby said fibers adhere to and flock said coated filament, said filaments each having one end embedded in said adhesive layer;
flattening and fixing the coated and flocked filament; and
orienting said fibers generally parallel to one another and transverse to said filament from about the point of exit of said fibers from said adhesive layer.

3,889,035

FIBER-REINFORCED PLASTIC ARTICLES

John Harry Jakes, Stamford, England, assignor to Marling Industries Limited, London, England

Filed Nov. 27, 1972, Ser. No. 309,617
Int. Cl. B32b 17/04, 17/10, 17/12
U.S. Cl. 428—227 12 Claims



1. A moldable sheet material, comprising
a. a mass of incompletely polymerized thermosetting resin;
b. at least one continuous web of stretchable glass fiber knitted fabric contained within and extending longitudinally of said resin mass;
c. first layers of randomly arranged glass fibers disposed on opposite sides of said fabric, respectively, for spacing said fabric from the major faces of said sheet material; and
d. a plurality of reinforcing glass fibers passing through said fabric with the ends of said reinforcing fibers locked in normal arrangement to the glass fiber layer surfaces, thereby to secure together said glass fiber layers.

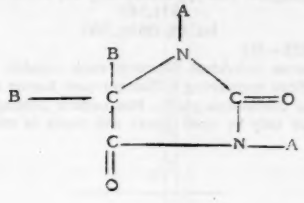
3,889,036

THEIC-HYDANTOIN-ESTER RESINS FOR WIRE COATINGS

Jerome A. Preston, Angola, Ind., assignor to Essex International Inc., Fort Wayne, Ind.

Division of Ser. No. 402,977, Oct. 3, 1973, Pat. No. 3,835,121, which is a continuation-in-part of Ser. No. 275,922, July 18, 1972, Pat. No. 3,779,991, which is a continuation-in-part of Ser. No. 58,173, July 24, 1970, Pat. No. 3,681,282. This application May 9, 1974, Ser. No. 468,517
Int. Cl. H01b 3/42; C08g 22/08
U.S. Cl. 428–383 8 Claims

1. An electrical conductor having a first coating of a resin composition having hydantoin and isocyanurate radicals in the polymer backbone which comprises the reaction product of:
a. a monomeric hydantoin compound having the structural formula



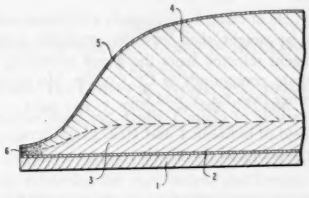
wherein A is H, OH; ROH; COOH; RCOOOH; NH_2; RNH_2; $(OR)_x$ OH wherein R is $(CH_2)_y$, y is 1-5, and x is an integer in the range of 1 to 10; or, R_1—O —R_2 wherein R_1 and R_2 are C_1—C_5 alkyl groups; and, B is H, OH, ROH, COOH, RCOOH, NH_2, RNH_2, or a C_1 —C_{10} alkyl group, or dimers or trimers of said monomeric hydantoin compound;
b. an aromatic carboxylic acid having at least two carboxy groups or an anhydride, ester, or chloride of said acid; and,
c. tris (2-hydroxyethyl)isocyanurate, as a polyhydric alcohol component;
d. said reaction effected at a temperature of about 150°C to about 280°C, and, a second nylon topcoat over said first coating.

3,889,037

MULTIPLE-LAYERED, WELDABLE PADDED ELEMENT

Heinz van den Berg, Hennef, Stadt Blankengerg, Germany, assignor to Dynamit Nobel Aktiengesellschaft, Germany

Filed May 16, 1974, Ser. No. 470,586
Claims priority, application Germany, May 16, 1973, 2324615
Int. Cl. B32b 3/26
U.S. Cl. 428—302 5 Claims



1. A multiple-layered padded element weldable in a high-frequency field, for example for use in the automobile industry, comprising a layer of PVC foam material provided between a cover layer of a thermoplastic synthetic resin film, and a dimensionally stable bottom layer, optionally coated with an auxiliary polymeric welding agent, and a layer provided be-

tween the PVC foam layer and the dimensionally stable bottom layer, said layer being joined to the layer of PVC foam material and comprising a welding wad of fibrous material wetted on its surface with a dispersion of a mixture of polyvinyl chloride and polyvinyl acetate.

3,889,038

COATED FILAMENT AND METHOD OF FORMING SAME

Sol B. Wiczer, 3235 Sleepy Hollow Rd., Falls Church, Va.

Continuation of Ser. No. 515,806, Dec. 21, 1965, abandoned, which is a continuation-in-part of Ser. No. 157,591, Dec. 6, 1961, Pat. No. 3,278,329, which is a continuation-in-part of Ser. No. 777,344, Dec. 1, 1958, abandoned, which is a continuation-in-part of Ser. No. 353,003, May 4, 1953, Pat. No. 2,862,284. This application July 11, 1969, Ser. No. 871,747

Int. Cl. D02g *3/00*

U.S. Cl. 428—361 **10 Claims**

1. Separate individual filaments each capable of use as artificial fiber comprising a filament core having a substantially even continuous plastic film surface coating thereon, interrupted only by open pocks and pores in said surface coating.

3,889,039

NUCLEATION AND ORIENTATION OF LINEAR POLYMERS

Eugene Wainer, Shaker Heights, Ohio, assignor to Horizons Incorporated, Cleveland, Ohio

Filed Apr. 26, 1973, Ser. No. 354,594

Int. Cl. B32b *5/16;* **H01f** *1/11, 1/30*

U.S. Cl. 428—404 **17 Claims**

1. A shaped synthetic polyalkylene terephthalate polymer article with enhanced physical properties consisting essentially of the following:

a body of liner polymer consisting of amorphous and crystalline segments and up to 50 percent by weight of a nucleating agent consisting of particles of a solid inorganic acicular silicate material distributed uniformly throughout said body and oriented in a preferred direction, said inorganic material consisting of crystals with A, B, and C-axes, the length of the C-axis of said crystals being within 10 percent of the length of the C-axis of the crystalline polymer, and the lengths of either the A or B axis of said crystals being within 20 percent of the lengths of the A or B-axis of the crystalline polymer, and the angle between the A-axis and the C-axis of said inorganic crystalline material being within 20 percent of the angle between the A-axis and the C-axis of said crystalline polymer.

9. The article of claim **1** additionally containing up to about 20 percent by weight of at least one magnetic non-metallic sweeping agent selected from the group consisting of oxide and phosphate compounds of Cr, Co, Fe, Mn or rare earth elements other than La, Y and Ce.

10. The article of claim **1** which has been subjected to a magnetic field of between 1 and 1000 gauss during at least a part of the molding of the article.

3,889,040

PROCESS FOR THE CONTINUOUS COATING OF PLASTICS

Joachim Wank, Zons; Eckart Reese, Dormagen; Josef Rohrbach, Schildgen, and Rolf Bruck, Odenthal, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed May 21, 1973, Ser. No. 362,483

Claims priority, application Germany, May 26, 1972, 2225644

Int. Cl. B32b *27/08*

U.S. Cl. 428—412 **1 Claim**

1. In the process for manufacturing a laminate by coating a substrate of an impact-resistant first plastic material with a second plastic material which is a polyurethane or an unsaturated polyester having a coefficient of static friction of up to 0.5, a modulus of elasticity of between 200 and 2,000 kg/cm², a maximum tolerated surface limiting work in the linear region of the stress-strain diagram, determined from a high-speed tear test at 10 m/sec on a test rod according to Buchmann, of less than 2,500 mkp/s . 1/cm² and a speed of recovery after stressing of between 1 and 10 m/sec, the improvement which comprises coating the first plastic material with a 30 to 80 percent by weight solution of said second plastic material containing admixed therewith a 5 to 40 percent by weight solution of a cellulose ester or a 0.1 to 10 percent by weight solution of a silicone oil, the amount of cellulose ester solution employed supplying 0.5 to 5 percent by weight of cellulose ester and the amount of silicone oil solution employed supplying 0.01 to 2 percent by weight of silicone oil, said amounts being based on the amount of second plastic material coated on said substrate.

3,889,041

MULTILAYER METALLIZED BERYLLIA CERAMICS AND A METHOD FOR PRODUCING THE SAME

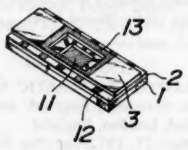
Shunzo Mase, and Tetsuo Watanabe, both of Nagoya, Japan, assignors to NGK Insulators Ltd., Nagoya, Japan

Filed Nov. 16, 1972, Ser. No. 307,147

Claims priority, application Japan, Nov. 22, 1971, 46/92997

Int. Cl. C04b *39/12;* **B32b** *31/26*

U.S. Cl. 428—472 **2 Claims**



1. Multilayer metallized sintered beryllia ceramics prepared from at least one metallizing layer present between unsintered beryllia sheets, said metallizing layer made from a metallizing paste consisting of 60–97% by weight of at least one metal selected from the group consisting of molybdenum and tungsten, 1.5–39.6% by weight of beryllia and 0.03–20% by weight of at least one rare earth metal oxide selected from the group consisting of lanthanum oxide, yttria and praseodymium oxide, provided that the amount of the rare earth metal oxide being not more than the amount of beryllia, a part of said metallizing layer being present in the sintered beryllia ceramics.

3,889,042

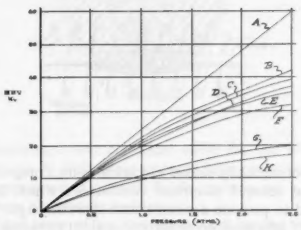
METHOD AND APPARATUS FOR COOLING AND INSULATING ELECTRICAL EQUIPMENT

Whitney H. Mears, Buffalo, N.Y., assignor to Allied Chemical Corporation, New York

Continuation-in-part of Ser. No. 318,301, Dec. 26, 1972, abandoned, which is a continuation-in-part of Ser. No. 60,680, Aug. 3, 1970, abandoned. This application Dec. 10, 1973, Ser. No. 423,614

Int. Cl. H01b 7/34

U.S. Cl. 174—15 R 28 Claims



1. A method for cooling and insulating high voltage electrical equipment which comprises bathing said high voltage electrical equipment in a fluidized bed comprising a particulate solid dielectric material, which is a dielectric anhydrous oxide or a plastic, said particulate solid dielectric material being chemically stable and solid at a temperature of about 150°C. and which is fluidized with a dielectric gas.

3,889,043

EARTHING JOINT FOR SHIELDING CHAMBERS ELECTRICALLY AND ELECTROMAGNETICALLY

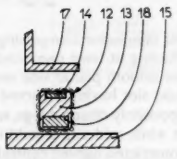
Emile Paul Jules Jean Ducros, 37, avenue of Saint Mande, Paris, France

Filed June 7, 1973, Ser. No. 367,833

Claims priority, application France, June 9, 1973, 72.20885

Int. Cl. H05k 9/00

U.S. Cl. 174—35 GC 4 Claims



1. A shielding gasket for use in an earthing joint for shielding chambers electrically and electromagnetically, comprising:

a flexible strip;

a magnetized material in the form of a first strip embedded close to one edge of said flexible strip; and,

an electrically conducting envelope of a metal mesh enclosing said flexible strip and its first strip of embedded magnetized material.

3,889,044

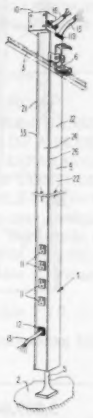
SERVICE POLES

Charles T. Flachbarth, and John L. Myers, both of Parkersburg, W. Va., assignors to Textron Inc., Providence, R.I.

Filed Apr. 29, 1974, Ser. No. 464,803

Int. Cl. H02g 3/04

U.S. Cl. 174—48 16 Claims



1. A service pole for supplying power and/or telephone outlets in a room, the pole being adapted to extend between the floor and the ceiling of the room and the ceiling being the suspended type having inverted T-bar members for supporting panels, the pole comprising:

an elongated, hollow housing for carrying power and/or telephone conductors, the housing being formed with one side open;

a cover removably connected to the housing and extending over said open side, the open side providing access to the interior of the housing with the cover removed; and

a T-bar and tie-rod hanger comprising a base engaging said housing adjacent the top thereof, removable clamp means engaging the housing and said base and holding the hanger against the housing, a pair of spaced jaws extending outwardly from the bottom of the base for receiving the leg of a T-bar therebetween, a screw threaded in one jaw and operative to engage the T-bar leg and clamp the same against the other jaw and a connector flange extending outwardly from the top of the base and having a slot for receiving a tie rod, said base, said clamp, said jaws and said connector flange each being spaced from said cover so as not to interfere with removal of the cover.

3,889,045

SECURING OF SERVICE LINES IN HOLLOW BOAT MASTS

John Logsdon, 101 Gedney St., Nyack, N.Y. 10960

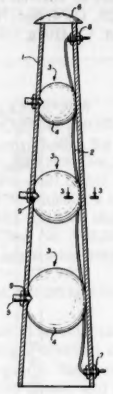
Filed Oct. 7, 1974, Ser. No. 512,600

Int. Cl. B63b 15/00; H02g 3/02

U.S. Cl. 174—70 R 6 Claims

1. In a boat mast having a longitudinally extending passageway therein rendering the mast hollow and having a line disposed within the passageway extending longitudinally thereof over a length such that the line tends to slap against the inside wall of the passageway when the boat rocks or pitches, thereby generating disturbing noise, the improvement which comprises at least one inflated balloon disposed within the passageway intermediate the ends thereof, closing the pas-

sageway, and holding the line against the passageway wall so that the slapping of the line against the passageway wall is



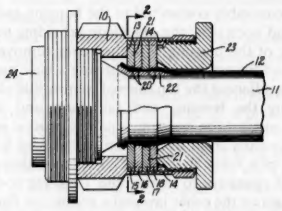
reduced, whereby said generating of disturbing noise is reduced.

3,889,046

STRAIN RELIEF AND GROUNDING DEVICE FOR SHIELDED ELECTRICAL CABLES

Robert C. Oberdiear, Los Angeles, Calif., assignor to Amex Systems, Inc., Lawndale, Calif.

Filed Aug. 27, 1973, Ser. No. 392,045
Int. Cl. H02g *15/02*; H01r *3/02*
U.S. Cl. 174—78 **5 Claims**



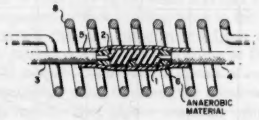
1. A strain relief and grounding assembly in combination with a shielded electrical cable, said assembly comprising a substantially cylindrical housing having an electrically conductive inner wall, four electrically conductive rings having equal outer diameters substantially corresponding to the inner diameter of said housing, said rings being mounted for longitudinal movement within said housing, stop means within said housing for limiting the longitudinal movement of said rings within said housing, said rings having openings therein of equal diameter which are slightly larger than the outer diameter of said cable, the opening in each of said rings being out of alignment with the openings in all of the other rings when said rings are mounted in said housing, said cable being movable through the openings in said rings when said rings are spaced apart from each other within said housing, and means exerting pressure against the opposite sides of said rings to move said rings into substantially adjacent relationship with each other so that the openings of said rings form a single combined opening of smaller diameter than the outer diameter of said cable, the inner peripheries of said rings being thereby held in tight engagement with the shielding of said cable at four different places spaced around the periphery of said shielding to provide simultaneous strain relief and electrical grounding of said cable, the compressive and strain relief force being divided between all of said rings.

3,889,047

SEALING AND MOISTURE-PROOFING OF ELECTRICAL JOINTS

David Carver, Sherman Oaks, Calif., assignor to Lockheed Aircraft Corporation, Burbank, Calif.

Filed Feb. 15, 1974, Ser. No. 443,105
Int. Cl. H02g *15/08*
U.S. Cl. 174—84 R **3 Claims**



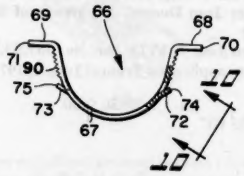
3. An hermetically sealed electrical joint comprising:
first and second electrical conductors which have been joined to provide a circuit path therethrough;
a mass of polymerized anaerobic sealant covering the joined portions of said conductors; and
a dielectric sleeve of heat-shrunk material disposed about the outer surface of said sealant so as to maintain the polymerization thereof by the exclusion of ambient air thereto.

3,889,048

ELECTRICAL CONNECTOR AND CLIP THEREFOR HAVING BARBS TO ENSURE PROPER PREASSEMBLY

John Elmer Groth, Cleveland Heights, Ohio, assignor to Erico Products, Inc., Cleveland, Ohio

Continuation-in-part of Ser. No. 298,769, Oct. 4, 1972, abandoned. This application Dec. 26, 1973, Ser. No. 428,137
Int. Cl. H02g *15/08*
U.S. Cl. 174—94 R **3 Claims**

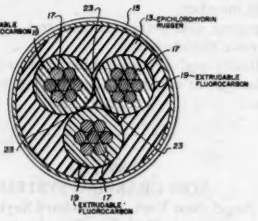


1. An electrical connector comprising a deformable relatively soft body having at least one conductor receiving slot therein, which has smooth planar side walls, an omega-shape resilient clip in said slot having a curved central portion and outwardly bent oppositely directed legs, said legs overlying the edges of said slot while said clip is held in said slot by spring pressure of the constricted curved central portion of said clip, said central portion of said clip having sharp projections biting into said planar side walls of said body resisting withdrawal of said resilient clip from said slot, the legs of said clip terminating in relatively sharp hard edges whereby when said clip is forced into said slot by a conductor, the body of said clip will enfold about the conductor while the sharp hard edges bite into the walls of such slot holding the conductor in such slot, said sharp projections being barbs struck from the sides of the curved central portion of said clip and projecting symmetrically one on each side of the clip outwardly of said slot at an angle to the walls thereof and having sharp terminal ends biting as aforesaid into the planar sidewalls of said body.

3,889,049
SUBMERSIBLE CABLE

Leo V. Legg, Tulsa, Okla., and Donatas Tijunelis, Buffalo Groove, Ill., assignors to Borg-Warner Corporation, Chicago, Ill.

Continuation of Ser. No. 342,008, March 16, 1973, abandoned. This application Jan. 14, 1974, Ser. No. 433,332
Int. Cl. H01b *7/18, 3/30*
U.S. Cl. 174—102 R **4 Claims**

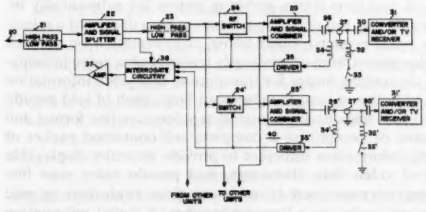


1. A multicomponent electrical cable for use with a submersible motor in high temperature, high pressure oil wells and in the presence of oil well fluids comprising:
at least one electrical conductor;
an extruded layer of insulating material having an average thickness of 0.010 inch to 0.080 inch surrounding the conductor;
said layer being of an extrudable fluorocarbon having a melting point of about 460°F;
a resilient fluid impervious jacket surrounding said insulating material;
said impervious jacket being of an epichlorohydrin rubber of high molecular weight protecting said extruded layer from well fluids; and
an outer armor surrounding said resilient jacket.

3,889,050
SUBSCRIPTION TELEVISION SYSTEM AND SWITCHING STATION THEREFOR

Wallace T. Thompson, El Paso, Tex., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Apr. 11, 1974, Ser. No. 460,025
Int. Cl. H04n *1/44*
U.S. Cl. 178—5.1 **23 Claims**

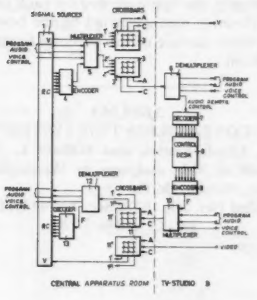


1. In a subscription television system wherein television signals are distributed via a cable, a switching station comprising:
coupling means for connection to said cable for receiving a composite signal including television signals and interrogation signals;
signal splitting means connected to said coupling means for separating the received signals;
switching means connected to said signal splitting means for receiving said television signals and for coupling said television signals therethrough in response to a switching signal;
output means connected to said switching means for providing signals to a subscriber drop cable;
sensing means connected to said output means and to said switching means for providing a switching signal to said switching means when the presence of a subscriber demand signal from the subscriber drop cable is detected thereby; and
interrogating means connected to said coupling means, said signal splitting means, and said sensing means for providing a signal to said coupling means indicative of the signal from said sensing means in response to said interrogation signals.

3,889,051
METHOD AND SYSTEM FOR TRANSMITTING SIGNALS FROM A SELECTED ONE OF A PLURALITY OF VIDEO SOURCES IN A CENTRAL APPARATUS ROOM AND THE ASSOCIATED AUDIO AND CONTROL SIGNALS TO AT LEAST ONE TELEVISION STUDIO

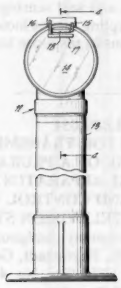
Ernst Legler, Seeheim, Germany, assignor to Robert Bosch Fernsehanlagen G.m.b.H., Darmstadt, Germany

Filed May 16, 1974, Ser. No. 470,468
Claims priority, application Germany, May 18, 1973, 2325192
Int. Cl. H04n *7/10, 7/18*
U.S. Cl. 178—5.6 **12 Claims**



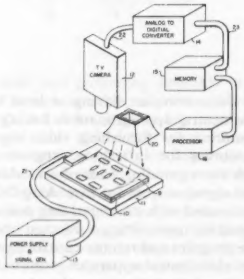
8. In a television complex having at least one television studio and one central apparatus room having a plurality of video signal sources for furnishing video signals, program audio signal sources for furnishing program audio signals associated with corresponding ones of said video signals and remote control signal sources for furnishing DC remote control signals associated with corresponding ones of said video signals, a method for transmitting a selected one of said video signals and the program and remote control signals associated therewith from said central apparatus room to said television studio comprising, in combination, the steps of converting each of said DC remote control signals to a corresponding audio frequency remote control signal; multiplexing each of said audio frequency remote control signals with the corresponding one of said program audio signals and furnishing corresponding multiplexer output signals; and switching said selected video signal and the corresponding one of said multiplexer output signals to a determined output for transmission to said television studio.

3,889,052
NAVIGATION AND SURVEILLANCE SYSTEM
Frank G. Back, 53 Sea Cliff Ave., Glen Cove, N.Y. 11542
Filed Oct. 19, 1973, Ser. No. 408,110
Int. Cl. H04n *7/18*
U.S. Cl. 178—6 **5 Claims**



1. A surveillance system comprising, in combination, two horizontally spaced viewing stations, each having a rotatable hollow housing, a window in the housing to admit light from an area to be viewed into the housing, a rockable prism to receive the light passing through the window and redirect it, a zoom lens to receive the light coming from the prism, a television camera to receive the light transmitted by the zoom lens, a television receiver connected to each of the television cameras to display the scene viewed by each of the viewing stations and cleaning means carried by the housings and directed at the outer surface of the windows to remove foreign matter therefrom.

3,889,053
CONTACTLESS TEST SYSTEM
Raymond A. Lloyd, Laurel, and William L. Hrybyk, Linthicum, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Oct. 30, 1973, Ser. No. 411,116
Int. Cl. H04n *7/18*
U.S. Cl. 178—6 **9 Claims**



1. A method for inspecting a member of a class of related device to determine its operational status, comprising the steps of:

a. coating the surface of a reference member with a first heat sensitive layer to convert heat patterns to light patterns;

b. scanning the surface of said first heat sensitive layer with a light sensitive device to generate a reference signal indicative of the temperature distribution of the surface of said reference member;

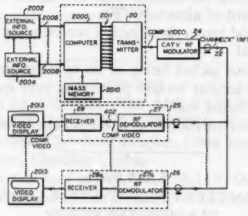
c. coating the surface of the member to be inspected with a second heat sensitive layer to convert heat patterns to light patterns;

d. scanning the surface of said second heat sensitive layer with a light sensitive detector to generate a test signal indicative of the temperature distribution of the surface of said member;

e. comparing said reference and test signals to identify difference therebetween;

f. statistically analyzing said difference to determine if said member to be inspected is operating within prescribed limits.

3,889,054
ROW GRABBING SYSTEM
Robert H. Nagel, New York, and Richard Saylor, Monsey, both of N.Y., assignors to IDR, Inc., New York, N.Y.
Filed Jan. 17, 1974, Ser. No. 434,226
Int. Cl. H04n *1/02*
U.S. Cl. 178—6.8 **27 Claims**

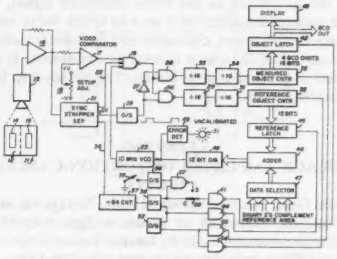


1. A real time frame grabbing system for substantially instantaneously providing a continuous video display of a selectable predetermined video frame of information on a video display means from continuously transmittable video information comprising means for transmitting said video information as a plurality of pseudo video scan lines, each of said pseudo video scan lines having a television video scan line format and capable of comprising a complete self-contained packet of digital information sufficient to provide an entire displayable row of video data characters, said pseudo video scan line having an associated transmission time equivalent to said television video scan line, said packet of digital information comprising at least address information for said displayable row and data information for said displayable characters in said displayable row, each of said pseudo video scan lines further comprising a horizontal sync signal at the beginning thereof, said horizontal sync signal providing a record separator between adjacent pseudo video scan lines, said transmitting means further comprising means for providing a vertical sync signal after a predetermined plurality of pseudo video scan lines have been transmitted, said pseudo video scan line being a composite video signal, said system further comprising television signal distribution means for distributing said transmitted composite pseudo video scan line signals to said video display means for providing said continuous video display.

3,889,055
OPTICAL METHOD AND APPARATUS FOR THE AREA MEASUREMENT OF OPAQUE OBJECTS

Robert F. Knight, Sunnyvale, Calif., assignor to International Imaging Systems, Mountain View, Calif.

Filed May 13, 1974, Ser. No. 469,076
Int. Cl. H04n 7/18
U.S. Cl. 178—6.8 4 Claims



1. The method for measuring the surface area of an opaque object comprising the steps of;

scanning the opaque measured object to produce a video signal output having a first time period directly proportional to the area of the object and scanning an opaque reference object with a known surface area to produce a video signal output having a second time period proportional to the area of said reference object,

passing a flow of pulses from a pulse source with a controllable pulse rate to a first counter during said first time period, the pulses counted during said first time period being proportional to the area of said measured object and serving as a measure of said area,

passing a flow of pulses from said pulse source to a second counter during said second time period, the pulses counted during said second time period being proportional to the area of said reference object,

comparing the pulse count obtained from said reference object scan with an established predetermined pulse count directly proportional to the surface area of said reference object to obtain an error signal output where said actual pulse count from said reference object during said scan differs from said established pulse count, and

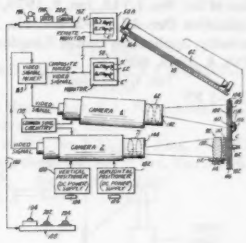
controlling the rate of said pulses produced from said pulse source in response to said error signal to maintain said actual count from said reference object scan substantially equal to said established predetermined count.

3,889,056
VIDEO SIGNATURE DECODER AND COMPARATOR AND METHOD

George L. Mayer, Jr., New Orleans, La., and David L. Dobbins, Austin, Tex., assignors to Coded Signatures, Inc., New Orleans, La.

Filed July 10, 1972, Ser. No. 270,053
Int. Cl. H04n 7/18
U.S. Cl. 178—6.8 41 Claims

1. The method of decoding encoded, recorded data comprising an array of discrete images obtained by the use of a fly's eye lens for comparison with other data, comprising the steps of: decoding the encoded data and producing an image thereof by positioning a similar fly's lens in confronting relation to the encoded data; simultaneously scanning, with television camera means, said decoded image and the data to be compared therewith; and transmitting the video signals from said camera means to a television set to visually present a

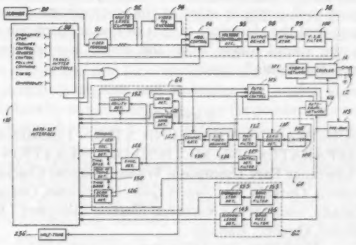


picture of the decoded image and the matter to be compared therewith on the screen of said television set.

3,889,057
FASCIMILE COMMUNICATION SYSTEM

Donald A. Perreault, Pittsford; Victor Lee Bedzyk, Fairport; Larry Richard Matthews, Victor; Roy Wilben Rivers, Conesus; David Rolling Shuey, Webster, and John David Torpie, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 253,827, May 16, 1972. This application Aug. 27, 1973, Ser. No. 391,694
Int. Cl. H04n 1/36
U.S. Cl. 178—69.5 F 1 Claim



1. A facsimile communication system having a transmitting station and a receiving station, said transmitting station adapted for line scanning graphic information which is to be transmitted to said receiving station and forming a video signal for transmission, said receiving station adapted for receiving said video signal and for line scanning a record medium for forming thereon a graphic image in accordance with information contained in the video signal and conforming to the image at said transmitting station, said receiving station including means for transporting a surface upon which an image is to be reproduced in a direction which is substantially perpendicular to the direction of motion of a scanning means, said transmitted signal including a synchronizing signal component for periodically synchronizing a scanning means at the receiving station with a scanning means at the transmitting station, said transmitting station including means for modulating said synchronizing signal to have a demodulated amplitude for indicating the rate at which said surface is to be transported, said transporting means being responsive to said demodulated amplitude for transporting said surface at the indicated rate.

3,889,058

TELEPHONE SYSTEMS WITH REDUCED ACOUSTIC FEEDBACK

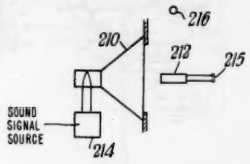
Saad Zaghoul Mohamed Gabr, London, England, assignor to A.R.D. Anstalt, Vaduz, Liechtenstein

Continuation of Ser. No. 1,743, Jan. 9, 1970, abandoned. This application Dec. 18, 1972, Ser. No. 315,807

Claims priority, application United Kingdom, Jan. 15, 1969, 2453/69; Feb. 4, 1969, 6009/69

Int. Cl. H04m *1/22*

U.S. Cl. 179—1 FS **10 Claims**



1. In combination, housing means, a single loudspeaker having a diaphragm having an axis of movement and an electrical input, microphone means having diaphragm means with exposed opposite sides and an electrical output, means mounting said single loudspeaker and said microphone means in close proximity in said housing means so that sound waves radiated by the loudspeaker diaphragm in response to energization of the loudspeaker travel in a direction parallel to the sides of the microphone diaphragm means directly and by a single sound path to the microphone means, the microphone diaphragm means being disposed substantially in a plane lying along the axis of movement of the loudspeaker diaphragm when the loudspeaker diaphragm moves in response to an electrical input to the loudspeaker, said opposite sides of said microphone diaphragm means being equidistant from said loudspeaker diaphragm, whereby the sound waves radiated by the loudspeaker diaphragm fall directly and substantially equally on said opposite sides of the microphone diaphragm means, so that the electrical output of the microphone means due to the sound waves from the single loudspeaker diaphragm is substantially zero.

3,889,059

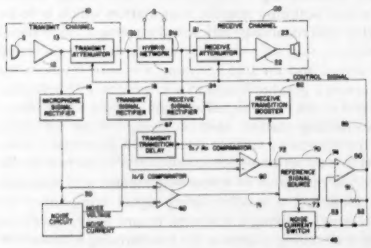
LOUDSPEAKING COMMUNICATION TERMINAL APPARATUS AND METHOD OF OPERATION

James Lawrence Earl Thompson; Wallace Eugene Clarke, both of Ottawa, Ontario, and James Gale, Hazeldean, Ontario, all of Canada, assignors to Northern Electric Company Limited, Montreal, Quebec, Canada

Filed Mar. 26, 1973, Ser. No. 345,223

Int. Cl. H04m *1/60*

U.S. Cl. 179—1 P **9 Claims**



1. In a loudspeaking communication terminal apparatus for connection to a transmission facility and having a transmit channel including a microphone, a receive channel including a loudspeaker, and a control means for activating the transmit channel to provide a transmit mode of operation and for activating the receive channel to provide a receive mode of operation, an improvement in the control means comprising:

means, responsive to signals from the microphone, having substantially monotonous amplitude envelope characteristics and substantially non-responsive to other signals, for generating a noise reference signal, representative of sounds of a substantially steady nature in the operating environment;

means, responsive to the activating of the transmit channel, for regulating the amplification thereof in inverse relation to the amplitude of the noise reference signal, whereby the natural tendency of a user to speak more loudly in a noisy environment, characterized by substantially monotonous noise, than in a quieter environment, is compensated to present a more constant signal level to the transmission facility.

3,889,060

FEEDBACK AMPLIFIER DISTORTION-CANCELLING CIRCUIT

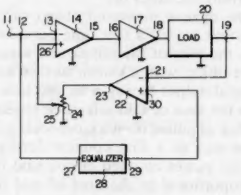
Toshiyuki Goto, Kadoma; Kouichi Kido, Neyagawa, and Akitoshi Yamada, Daito, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Sept. 10, 1973, Ser. No. 395,431

Claims priority, application Japan, Sept. 11, 1972, 47-91544; May 18, 1973, 48-55866; May 30, 1973, 48-61295; Aug. 15, 1973, 48-91827; Aug. 5, 1973, 48-91828

Int. Cl. H03f *1/32*

U.S. Cl. 179—1 F **7 Claims**



1. A sound reproducing system comprising an amplifier for amplifying an input signal, a speaker driven by the output of said amplifier, and a differential amplifier for comparing a signal derived from said speaker containing a distortion component generated due to the non-linear characteristics of said speaker with another signal obtained in proportion to said input signal to extract only the distortion component, the output of said differential amplifier being coupled in opposite polarity to said amplifier, thereby eliminating the distortion component.

3,889,061

FOUR-CHANNEL REPRODUCING SYSTEM

Ryosuke Ito, and Susumu Takahashi, both of Tokyo, Japan, assignors to Sansui Electric Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 315,928, Dec. 18, 1972. This application Dec. 26, 1973, Ser. No. 428,423

Int. Cl. H04r *5/00*

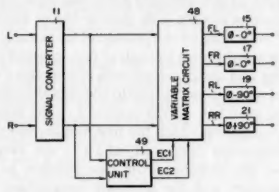
U.S. Cl. 179—1 GQ **13 Claims**

1. A sound reproducing system for reproducing stereophonically related first and second channel signals from a two-channel signal source by means of a four-channel reproducing system, said system comprising a combination of:

first means connected to receive the first and second channel signals for producing first and second composite signals by combining the first and second channel signals with such amplitude and phase relationships that the first composite signal contains a greater proportion of the first channel signal and a smaller proportion of the second channel signal, the second composite signal contains a

greater proportion of the second channel signal and a smaller proportion of the first channel signal, and for producing phase differences between the first and second composite signals with respect to the first and second channel signals respectively which vary as a function of frequency of the first and second channel signals;

control means connected to receive the first and second composite signals for producing control outputs the levels of which vary depending on the phase relationship between the first and second composite signals; and



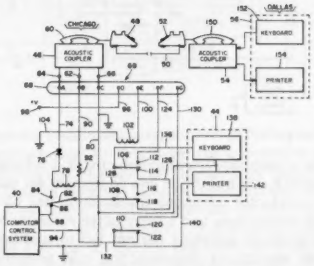
second means connected to receive, as first and second input signals, the first and second composite signals or the first and second channel signals for producing four-channel output signals by combining the first and second input signals, said second means being operative to produce the four-channel output siganls varying at least mixing ratios of the first and second input signals depending on the levels of the control outputs of said control means.

3,889,062

SYSTEM AND METHOD FOR COUPLING REMOTE DATA TERMINALS VIA TELEPHONE LINES

Barry M. Epstein, Dallas, Tex., assignor to Action Communication Systems, Inc., Dallas, Tex.

Filed Oct. 2, 1972, Ser. No. 293,774
Int. Cl. H04h *11/06*
U.S. Cl. 179—2 DP **5 Claims**



1. A data station comprising:

a data terminal having input apparatus and an output display,

a computer system for receiving input signals from said input apparatus and for controlling the operation of said output display,

means for coupling said input apparatus and output display through a conventional telephone channel to a remote data terminal,

means selectively operable in conjunction with said coupling means for interrupting the connections between said computer system and said input apparatus of said data terminal, means for substituting an alternate input connection to said computer system to simulate the impedance of said data terminal in an inactive mode to prevent interruption of the operation of said computer system, and

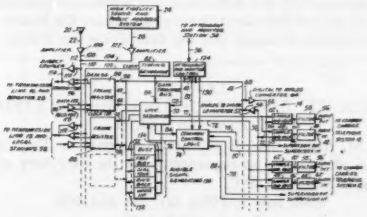
means for coupling said disconnected data terminal through a conventional telephone channel to input and receive data to and from a remote computer and to a remote data terminal.

3,889,063

MULTIPLEXED DIGITAL DATA COMMUNICATION SYSTEM

Martin J. Slavin, Huntington, L.I., N.Y., assignor to Phonplex Corporation, Huntington, L.I., N.Y.

Continuation of Ser. No. 173,168, Aug. 19, 1971. This application Sept. 24, 1973, Ser. No. 399,037
Int. Cl. H04j *3/00*
U.S. Cl. 179—15 A **22 Claims**



1. A digital data communication system for connection between a user and a telephone system having a plurality of input channels comprising, central station means coupled to said telephone system for receiving analog signals therefrom and for applying analog signals thereto; a plurality of local station means each adapted to receive analog signals from said user and for supplying analog signals to said user; communication transmission means operatively coupling said plurality of local station means to said central station means, said central station means and said local station means both being adapted to coordinately digitize and multiplex the analog signals received thereby at a first sampling rate for producing a communication signal applied to said transmission means including a series of discrete digital signals in a series of time slots, both said central station means and said local station means being adapted to coordinately demultiplex and convert from digital to analog portions of said communication signal received thereby for applying selected analog signals to said telephone system input channels to said user respectively; and data transmission means for automatically substituting digital data signals for the discrete digital signals representative of said analog signals in periodically spaced selected ones of said time slots of said communication signal, said data transmission means causing said substitution to be made at a second rate substantially lower than said first sampling rate.

3,889,064

ASYNCHRONOUS, MULTIPLEXING, SINGLE LINE TRANSMISSION AND RECOVERY DATA SYSTEM

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Tage O. Anderson, Salt Lake City, Utah

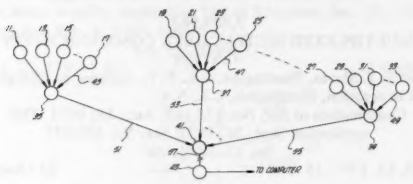
Filed Mar. 27, 1974, Ser. No. 455,163
Int. Cl. H04j *3/06*
U.S. Cl. 179—15 BS **11 Claims**

1. A unidirectional, single channel communication system for transmitting binary data from a plurality of satellite data sampling sites to a central location, comprising:

means at each of said satellite data sampling sites for forming of a pair of satellite message frames each having a

binary synchronizing sequence, a satellite identification sequence and data words;

means responsive to received satellite message frames from said plurality of sampling sites for asynchronously multiplexing a pair of frames from each satellite location onto a single transmission channel; and



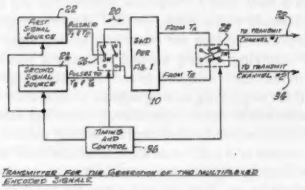
satellite message receiving means at said central location for synchronizing and demultiplexing a frame in accordance with the satellite identification sequence, the binary synchronizing sequence and the data words per frame.

3,889,065

ACOUSTIC DEVICES FOR TIME-MULTIPLEXED COMMUNICATION

James M. Alsup, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 1, 1974, Ser. No. 484,490
Int. Cl. H04k 1/10
U.S. Cl. 179—15 BC **6 Claims**



TRANSMITTER FOR THE GENERATION OF TWO MULTIPLEXED ENCODED CHANNELS

1. A transmitter for time-multiplexed communication utilizing complementary non-interacting codes, comprising:

an acoustic surface-wave device, which provides two parallel signal propagation paths on its surface, comprising;

a substrate, capable of propagating acoustic surface waves;

a pair of coded interdigitated electrode structures disposed upon the substrate, one structure in each of the propagation paths, one structure coded according to one member of a complementary pair, the other structure coded according to the other member of a complementary pair, each coded electrode structure transducing an acoustic wave propagating in its respective propagation path into an output electrical signal which may be transmitted externally of the substrate by means of output leads; and

two pairs of uncoded interdigitated electrode structures disposed upon the substrate, one pair in each of the two propagation paths on each side of the coded electrode structures;

the acoustic surface-wave device having the property that a single electrical pulse applied to the uncoded electrode structure results in a multiple-pulse (or multisample) electrical output signal at the output leads;

a first signal source for generating pulses, whose output is connected to those two of the uncoded electrode structures which are on the same side of the coded electrode structures; one structure from each pair of uncoded electrode structures, the signal source generating a stream of pulses;

a second signal source, also for generating pulses, whose output is connected to the other two uncoded electrode structures, the second signal source generating a stream of pulses in the intervals of time when the first signal source is not generating a stream of pulses;

a signal source switch, whose input terminals are connected to the outputs of the first and second signal sources and whose output terminals are connected to, respectively, each pair of the uncoded electrode structures;

a multiplexing double-pole double-throw switch, for alternately switching an output signal from each of the coded electrical structures to each of two transmit channels; and a timing and control apparatus connected to the first and second signal sources and to the signal source and multiplexing switches, which control (1) the time periods, or intervals, during which the first and second signal sources are alternately energized, and (2) the switching of the arms of the switches from one position to the other in synchronism with the alternate enegization of the signal sources;

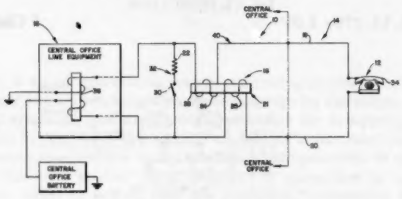
with the result that a stream of intermittent pulses from the signal sources becomes a pair of more or less continuous streams of samples which are sent via two transmit channels, with channel exchange occurring at intervals determined by the timing control, the streams of output samples concealing coded information.

3,889,066

RELAY RANGE EXTENDER FOR TELEPHONE SYSTEMS

Frank L. Simokat, Euless, and Clifford E. Greene, Fort Worth, both of Tex., assignors to Superior Continental Corporation, Hickory, N.C.

Filed Oct. 12, 1973, Ser. No. 405,787
Int. Cl. H04m 1/76
U.S. Cl. 179—16 F **1 Claim**



1. In a telephone transmission circuit, a telephone having a hookswitch, central office line equipment for said telephone, a two-conductor telephone transmission line having first and second conductors, and a relay range extender for increasing the amount of operating current fed to said line equipment without electrically disconnecting said telephone from the central office in which said line equipment is located, said relay range extender comprising a balanced two-winding relay and resistor means, said relay having a set of normally open contacts and a pair of windings which have substantially equal resistances and which are respectively connected to and in series with said first and second conductors, said telephone being electrically connected by said line and said windings to said line equipment, said windings, said conductors and said hookswitch being connected in a loop circuit to provide for current flow serially through one of said windings, said first conductor, said hookswitch, said second conductor and the other of said windings, said resistor means and said set of normally open contacts being connected in series in a circuit branch which is in parallel with said loop circuit, said hookswitch being effective upon closure to complete a circuit through said loop circuit for energizing said windings and for

maintaining said windings energized as long as said hookswitch is closed, and said set of contacts being closed by energization of said windings to complete a circuit which electrically connects said resistor means in parallel with said loop circuit and in series with at least one relay in said line equipment as long as said hookswitch is closed, said resistor means having a pre-selected resistance which when connected in parallel with said loop circuit branch by closure of said set of contacts increases the operating current for said line equipment relay over the value that it would have if said resistor means were not connected in parallel with said loop circuit without reducing the telephone operating current fed through said loop circuit below the amount needed for operation of said telephone.

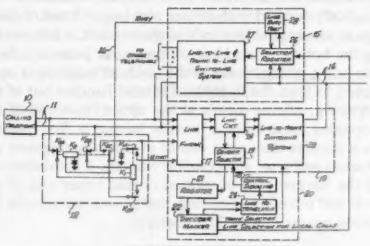
Referring to the drawing, the telephone transmission circuit, which incorporates the principles of this invention, is generally indicated at **10** and comprises a subscriber's telephone **12** of conventional construction, a two-conductor telephone transmission line **14,** conventional central office line equipment **16** and a relay range extender **18.** The conductors of line **14** are indicated at **19** and **20** respectively. Conductors **19** and **20** are conventionally connected to operating terminals of telephone **12** which is remote from the central office.

3,889,067

DIGITAL TELEPHONE SWITCHING SYSTEM

Irving S. Reed, Santa Monica, and Irving R. Obenchain, Jr., Pacific Palisades, both of Calif., assignors to Technology Service Corporation, Santa Monica, Calif.

Filed Oct. 24, 1973, Ser. No. 409,062
Int. Cl. H04m *3/00*
U.S. Cl. 179—18 J **6 Claims**



1. In a telephone system of the type in which dialing or other control signals are used to determine the connection to be made between any one of a plurality of telephone lines calling another line selected from the same or other plurality of telephone lines, a switching matrix at one site interfacing with standard two or four-wire telephone transmission lines for switching from one line to another communication signal of the form produced by the user independently of the switching matrix, said switching matrix comprising

means responsive to a calling line initiating a call for generating a digital code, X_M, uniquely identifying said calling line,

means responsive to control signals received from said calling line for generating a digital code, X_N, uniquely identifying another line called,

a plurality of converting means, one for each of said plurality of lines which may be calling, each converting means serving to convert communication signals received from its associated line to digital form,

a plurality of reconverting means, one for each of said plurality of lines which may be called, each reconverting means serving to convert communication signals received to analog form for transmission through its associated line, and

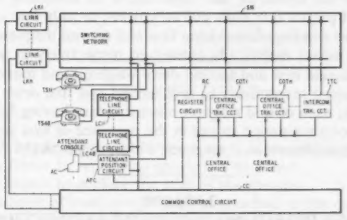
switching means responsive to said digital codes X_M and X_N for routing communication signals in digital form from a converting means associated with a calling line to a reconverting means associated with a called line, all of said converting, switching and reconverting means being at said one site, whereby all transmission to and from said switching matrix is in digital form.

3,889,068

CAMP-ON CIRCUITRY

Raymond Whyte Dellecker, Denver, Colo., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 27, 1974, Ser. No. 483,898
Int. Cl. H04m *3/42*
U.S. Cl. 179—18 BG **19 Claims**



1. Camp-on circuitry for use in a communication system having

a plurality of line circuits and

means for selectively applying an enabling signal to said circuits to determine the busy-idle call status of said circuits, and said circuitry comprising;

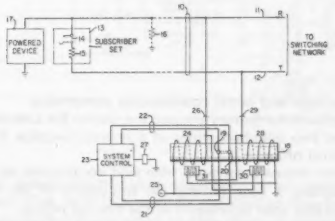
means responsive to a receipt of a busy call status signal from a called one of said circuits for withdrawing said enabling signal from said circuits to ascertain the camp-on busy-idle status of said called one of said circuits, and busy control means subsequently responsive to a receipt of a camp-on busy status signal from said called one of said circuits for controlling a return of a supervisory busy signal to a calling station.

3,889,069

LINE SUPERVISORY CIRCUIT

Cyrus Frank Ault, Wheaton, Ill., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 4, 1974, Ser. No. 439,346
Int. Cl. H03k *17/82;* **G11c** *11/14*
U.S. Cl. 179—18 F **4 Claims**



1. An electrical circuit for monitoring current in a monitored circuit comprising

a magnetic element of a material exhibiting substantially rectangular hysteresis characteristics and presenting a closed and a partial flux path,

an interrogate winding coupled to said closed flux path for selectively establishing remanent flux in said closed flux path to a first state and to a second state,

means for generating an inhibiting flux in said magnetic element for preventing said remanent flux from switching from said first state to said second state comprising

a first and a second drive winding coupled to said partial flux path, said monitored circuit completing a conducting path between said first and second drive windings when in one operative state, said drive windings being individually coupled in a sense and in a number of turns so that a current of a predetermined value in said monitored circuit is sufficient to induce said inhibiting flux in said partial flux path,

means for sensing said switching of said remanent flux comprising a readout winding coupled to said closed flux path, and

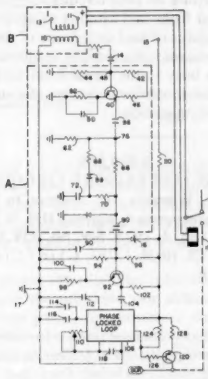
means for inhibiting the induction of an inhibiting flux in said partial flux path due to current in only one of said drive windings comprising first and second magnetoresistor means electrically connected respectively in parallel with said first and second drive windings and inductively coupled respectively to said second and first drive windings, each of said magnetoresistor means having first and second resistance values in the presence of first and second predetermined magnetic fields, respectively.

3,889,070

TONE DETECTING TELEPHONE CONNECTION MONITOR

Melvin Neal Oatis, Tustin, and Henry V. McNulty, Corona Del Mar, both of Calif., assignors to Telephonic Equipment Company, Santa Ana, Calif.

Filed June 4, 1973, Ser. No. 366,720
Int. Cl. H04b *3/46;* **H04m** *1/00*
U.S. Cl. 179—18 F **5 Claims**



1. The new and novel combination comprising:

a telephone temporary connection means for connecting at least two telephone lines at a remote location from the central office;

monitor means associated with said connection means for detecting a tone having the frequency of the timeout indicator tone developed at the central office;

a frequency sensitive means connected to the output of said monitor means for responding to said timeout indicator tone wherein an output signal can be provided when said frequency sensitive means senses the timeout indicator tone; and,

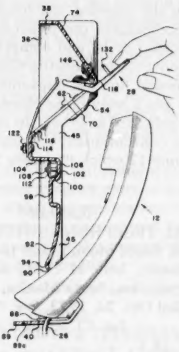
a warming device which is responsive to the output signal of said frequency sensitive means for apprising an operator of said connection apparatus of a terminated usage of the connected lines.

3,889,071

HANDSET CRADLE

John E. Davis, Sun Valley, and Wayne E. Bulgrin, Lone Pine, both of Calif., assignors to Lockheed Aircraft Corporation, Burbank, Calif.

Filed Oct. 1, 1973, Ser. No. 402,633
Int. Cl. H04m *1/02, 1/18*
U.S. Cl. 179—100 R **10 Claims**



1. A wall-mountable cradle for a telephone handset comprising a body formed with upper and lower forward-facing openings to receive the two ends of the handset, a bottom wall defining the bottom of said lower opening to locate the handset in the body, spring means at the inside of said upper opening adapted to urge the upper end of said handset out of said upper opening, release means at the upper front end of said upper opening, said release means having a first position wherein it secures the upper end of said handset against said spring means and a second position wherein it is substantially clear of the normal path of motion of said upper end of said handset in and out of said opening, and means to normally bias said release means to said first position.

3,889,072

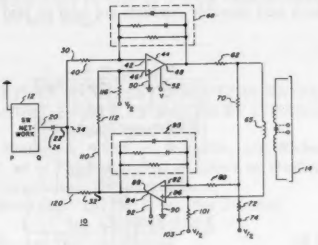
BI-DIRECTIONAL AMPLIFICATION APPARATUS

Alan Stewart, Elk Grove Village, Ill., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Oct. 19, 1973, Ser. No. 407,914
Int. Cl. H04b *3/36*
U.S. Cl. 179—170 R **5 Claims**

1. A two-wire, bi-directional voice amplification apparatus adapted to transmit and receive voice frequency signals between a single wire, ground return line coupled to one end of the apparatus and a line coupled to the other end, said apparatus comprising a single wire path for each direction of transmission with both said single wire paths joined to the respective lines at the ends of said apparatus, amplifying means in each path, each said amplifying means including a first and a second input and a single output, means biasing each said amplifying means to a difference amplifier configuration for providing unidirectional signal passage therethrough, the first input to a first of said amplifying means being coupled to said one end of the apparatus and the first input to a second of said amplifying means coupled to the line at the other end, respective feedback networks coupling the second input of each of said amplifying means to the output of the respective other amplifying means for cancelling signals fed back from the respective outputs through the feedback paths, means balanc-

ing the first input of said first amplifying means against the second input to cause amplification of signals transmitted to said inputs, and means in the feedback network from the



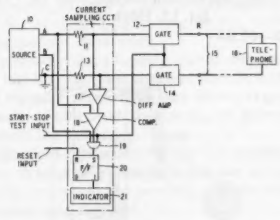
output of said first amplifying means for attenuating AC signals directed to the input to which said network is coupled to prevent noise due to voice frequency alternating current signals and oscillation in said apparatus.

3,889,073

DETECTION OF SERIES-RESONANT CIRCUITS CONNECTED ACROSS TRANSMISSION PATHS

Richard Scott Hoppough, and Herbert Bryant Walker, all of Greensboro, N.C., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 6, 1974, Ser. No. 448,456
Int. Cl. H04b *3/46*
U.S. Cl. 179—175.2 B **5 Claims**



1. In a test circuit for detecting an impedance connected across a transmission path by connecting a source of voltage across said path and a current monitoring means in said path, an improvement to enable the detection of an impedance in the form of a series-resonant circuit,

said improvement comprising, said source producing a series of substantially rectangular waves where said waves have a fundamental component at substantially the same frequency as the resonant frequency of said series-resonant circuit, and

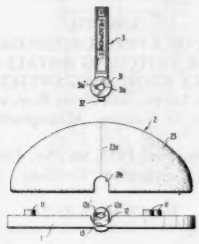
said current monitoring means samples said current to produce an output in response to said current exceeding a predetermined level during the midportion of at least one of said rectangular waves.

3,889,074

HEAD PHONE UNIT

Tadasi Itagaki, Tokorozawa, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Nov. 6, 1973, Ser. No. 413,285
Claims priority, application Japan, Nov. 14, 1972, 47-130300; Nov. 14, 1972, 47-130301
Int. Cl. H04r *1/10*
U.S. Cl. 179—182 R **5 Claims**



1. A head phone unit having a speaker comprising:

a. a frame to which the speaker is attached,

b. a cover to enclose the rear of the speaker,

c. a layer of cushioning material attached to the outer surface of the cover, the cushioning material having a seam extending across said cover,

d. means to attach said cover to said frame, wherein said attachment means covers said seam in said cushioning means,

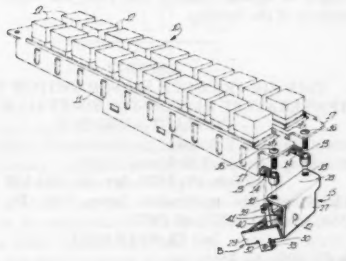
e. means to pivotally connect said frame to a head band.

3,889,075

INTERCONNECTOR LATCH ASSEMBLY FOR PLURAL BANKS OF MULTIPLE PUSHBUTTON SWITCHES

Ronald Joseph Morrell; Beverley William Gumb, and Graham Stirling Laing, all of London, Ontario, Canada, assignors to Northern Electric Company Limited, Montreal, Quebec, Canada

Filed Nov. 6, 1974, Ser. No. 521,357
Int. Cl. H01h *9/26*
U.S. Cl. 200—5 E **7 Claims**



1. An interconnector for mechanically interconnecting latch bars of at least two multiple pushbutton switch assemblies, said latch bars adapted to lock down any pushbutton moved to an actuated position and movable from said lock down position to an unlocking position, said interconnector comprising an extension on one end of each latch bar;

a frame member mounted adjacent said ends of said latch bars and including a base flange and two side webs, a web on each end of said base flange;

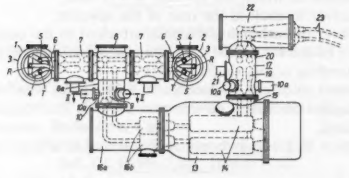
a connecting member having spaced parallel edges;
means on one of said edges pivotally mounting said connecting member in said side webs;
means on the other of said edges in engagement with said extensions on said latch bars;
and means resiliently engaging said connecting member to urge said latch bars to said lock down position;
the arrangement such that actuation of any pushbutton actuates said connecting member and every latch bar engaging with said connecting member.

3,889,076

COMBINATION OF A PRESSURIZED-GAS INSULATED HIGH-VOLTAGE SWITCHING INSTALLATION AND A MULTI-POLE GROUNDING SWITCH DEVICE

Willi Olsen; Dieter Lorenz, and Heinz Beer, all of Berlin, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Nov. 16, 1973, Ser. No. 416,524
Claims priority, application Germany, Nov. 30, 1972, 2259056
Int. Cl. H01h *21/28*
U.S. Cl. 200—48 R **4 Claims**



1. The combination of a pressurized-gas insulated high-voltage installation having a metal housing for accommodating a plurality of phase-conductors and of at least one multi-pole grounding switch device including a plurality of ground switching pins corresponding to respective ones of the phase-conductors, each of the switching pins being movable between open and closed positions to respectively disconnect and connect the corresponding phase-conductor electrically with the metal housing, the switching pins being disposed in a radially extending transverse to the metal housing and being arranged in spaced relation one from the other about the periphery of the housing.

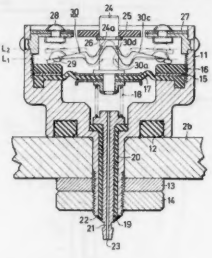
3,889,077

TIRE AIR PRESSURE SENSOR SWITCH WITH TEMPERATURE RESPONSIVE BIMETALLIC FIXED CONTACT ASSEMBLY

Tadashi Hayashi, Yokosuka, Japan, assignor to Nissan Motor Company Limited, Yokohama, Japan

Filed Feb. 19, 1974, Ser. No. 443,619
Claims priority, application Japan, Feb. 20, 1973, 48-20333; Mar. 16, 1973, 48-29978
Int. Cl. H01h *35/24*
U.S. Cl. 200—61.25 **4 Claims**

1. A tire pressure sensor comprising:
housing means;
a diaphragm disposed in said housing means so as to sealingly divide said housing means into first and second chambers, said first and second chambers respectively communicating with the inside of the tire and the atmosphere;
a compression spring disposed in said second chamber for urging said diaphragm toward said first chamber;
an actuating rod disposed in said first chamber and connected at its one end to said diaphragm so as to longitudinally move with said diaphragm when pressure change within the tire occurs;
a snap-action spring blade fixed at the central portion thereof on a generally intermediate portion of said actuating rod and having a pair of movable contacts at the opposed positions thereof, said spring blade having first and second states of operation thereof and changing its states when it receives two opposite moments about the central portion thereof, said first state being a state in which said movable contacts are near to said diaphragm



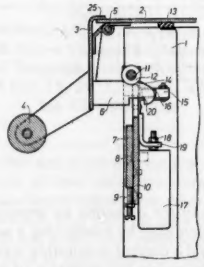
and said second state being a state in which said movable contacts are remote from said diaphragm; and
a pair of bimetallic support members fixedly disposed in said first chamber so that said spring blade is interposed between said support members and said diaphragm, said support members being constructed to bend toward said second chamber when heated and being provided with a pair of stationary contacts respectively contacting with said movable contacts when said spring blade moves into said second state thereof.

3,889,078

APPLIANCE LID INTERLOCK MECHANISM WITH LID OPERATED SWITCH AND SOLENOID CONTROLLED LID LATCH

Bo Henry Wessman, Motala, Sweden, assignor to AB Motala Verkstad, Motala, Sweden

Filed May 9, 1973, Ser. No. 358,541
Claims priority, application Sweden, May 10, 1972, 6249/72
Int. Cl. H01h *3/16*
U.S. Cl. 200—61.64 **4 Claims**



1. In a container having a lid associated therewith for opening and closing the same, in combination, an arrangement for retaining the lid in closed position comprising a clasp plate hinged adjacent at one end to a margin of the interior side of said lid for pivotal movement between operative lid-retaining and inoperative lid-releasing positions, a latching tongue projecting from said plate generally toward said container for movement with said plate, said tongue having a depression on the side thereof facing said lid, detent means supported on

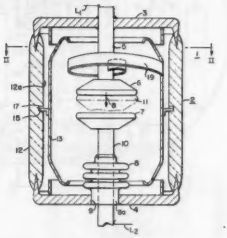
said container for cooperative engagement with said depression when said clasp plate is pivoted to said operative position to retain said lid in its closed position, and a flange lip projecting rigidly from the hinged end of said clasp plate to positively bear against the adjacent marginal edge of said lid when said clasp plate is in operative position, said lip moving out of such engagement when said clasp plate is pivoted to inoperative position, whereby the latching force active on said clasp plate is carried substantially by said lip bearing against the lid edge rather than by said hinge.

3,889,079

VACUUM-TYPE CIRCUIT INTERRUPTERS HAVING AN AXIAL MAGNETIC FIELD PRODUCED BY CONDENSING SHIELD COILS

Werner S. Emmerich; Clive W. Kimblin, and Richard L. Hundstad, all of Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 14, 1973, Ser. No. 397,564
Int. Cl. H01h *33/66*
U.S. Cl. 200—144 B **18 Claims**



1. A circuit-interrupting device of the vacuum type comprising, in combination:

a. means defining a highly-evacuated envelope including an insulating casing;

b. a pair of electrodes disposed within said highly-evacuated envelope and having a fixed gap therebetween at least in the fully-open position of said interrupting device;

c. means for at times establishing an arc across said gap between the two electrodes;

d. metallic condensing-shielding means disposed interiorly of said highly-evacuated envelope for preventing deposition of metallic vapor from the arcing region onto the inner walls of said insulating casing for preventing flashover across the insulating casing;

e. magnetic field-producing means for developing across said gap an axial magnetic field that has its lines of force extending across said gap generally parallel to the longitudinal axis of said arc; and,

f. said magnetic field-producing means including a field-coil electrically interconnecting said metallic condensing shielding means to one of said electrodes.

3,889,080

VACUUM INTERRUPTER SHIELD PROTECTOR

Werner S. Emmerich, Pittsburgh, and Francis Alan Holmes, Monroeville, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 19, 1973, Ser. No. 426,392
Int. Cl. H01h *33/66*
U.S. Cl. 200—144 B **16 Claims**

1. A vacuum type circuit interrupter comprising:

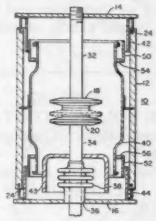
a tubular insulating envelope being sealed and evacuated;

a first end cap sealing one end of said tubular insulating envelope;

a second end cap sealing the other end of said tubular insulating envelope;

a stationary contact supported from said first end cap within said tubular insulating envelope;

a movable contact disposed within said insulating envelope being relatively movable with respect to said stationary contact between a closed position in engagement with said stationary contact and an open position separated



from said stationary contact to form an arcing gap therebetween;

a main shield generally tubular shaped partially surrounding said first contact and said second contact and being alinged with the longitudinal axis of said tubular insulating envelope; and,

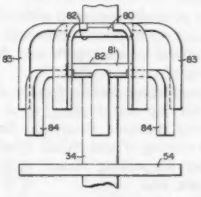
said main shield being metallic and including a layer of insulating material surrounding and on at least the outside ends of said main shield.

3,889,081

VACUUM INTERRUPTER CONTACTS HAVING ENERGY DISSIPATION SURFACES

Richard L. Hundstad, Pittsburgh, Pa., assignor to Westinghouse Electric Corporatic . Pittsburgh, Pa.

Division of Ser. No. 264,700, June 20, 1972. This application Feb. 12, 1974, Ser. No. 441,925
Int. Cl. H01h *33/66*
U.S. Cl. 200—144 B **9 Claims**



1. A vacuum-type circuit interrupter comprising:

a sealed highly evacuated insulating envelope;

a first contact being relatively stationary and disposed within said evacuated insulating envelope;

a second contact being relatively movable between a closed position in engagement with said first contact and an open position spaced from said first contact to form an arcing gap therebetween across which an arc is formed during circuit interruption and being disposed within said evacuated insulating envelope;

said first and said second contacts each including a central main contact portion;

a first plurality of circumferentially spaced radially outward and axially extending conducting L-shaped arc dissipation surfaces emanating radially outward from said central main contact portion of said first contact past the central main contact portion of said second contact;

a second plurality of circumferentially spaced radially outward and axially extending conducting L-shaped arc

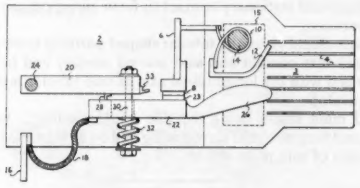
dissipation surfaces emanating radially ourward from said central main contact portion of said second contact and extending axially in the same direction as said first plurality of circumferentially spaced radially outward and axially extending conducting L-shaped arc dissipation surfaces whereby upon separation of said contacts the arc established is moved to a position between one of said L-shaped arc dissipation portions of said first contact and one of said L-shaped arc dissipation portions of said second contact so that vaporized metal will be free to disperse radially and axially of said arc dissipation surfaces.

3,889,082

HIGH VOLTAGE CONTACTOR

George L. McFarland, Salem, Va., assignor to General Electric Company, Salem, Va.

Filed Dec. 19, 1973, Ser. No. 426,063
Int. Cl. H01h *33/12*
U.S. Cl. 200—146 R **1 Claim**



1. A contactor having an arc supporting capaability and comprising:

a housing including arc suppression means comprising an arc chute;

a stationary contact tip for carrying current when said contactor is closed;

first arc supporting means electrically connected to said stationary contact tip and disposed within said arc chute for carrying current during the opening and closing of said contactor;

closure means pivotally mounted within said housing;

a second contact tip disposed upon said closure means for making electrical contact with said first contact tip to effect closing of said contactor;

second arc supporting means fixedly connected to said second contact tip and disposed so as to be separated a predetermined distance from said first arc supporting means after closing of said circuit breaker and to contact said first arc supporting means upon pivoting of said closure means; and

said arc chute and said first and second arc supporting means having a width substantially less than the width of said contact tips, said second arc supporting means extending into said arc chute wherein arcing between said first and second arc supporting means is initiated within said arc chute.

3,889,083

GAS CIRCUIT BREAKER INSULATING TUBE SUPPORT AND HIGH PRESSURE VESSEL

Giovanni Paolo Guaglione, Irvine; James R. McCloud, Burbank, both of Calif., and Hansruedi Aumayer, Harleysville, Pa., assignors to I-T-E Imperial Corporation, Spring House, Pa.

Filed Sept. 19, 1973, Ser. No. 398,858
Int. Cl. H01h *33/42*
U.S. Cl. 200—148 B **10 Claims**

1. A dead tank circuit breaker comprising, in combination:

a generally flattened spherical metallic tank filled with a dielectric gas at relatively low pressure;

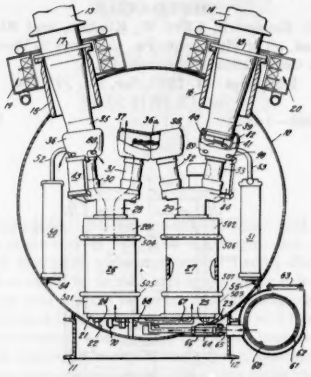
a pair of terminal bushings entering the top of said tank and extending into the interior of said tank;

a plurality of gas blast circuit interrupters supported within said tank and insulated from said tank and electrically connected in series with one another, and electrically connected between said pair of terminal bushings;

a support platform secured to the bottom of said tank;

a relatively high pressure supply means disposed externally of said tank;

and an interrupter support; said interrupter support comprising a hollow uniform cylindrical insulation tube of relatively thin wall thickness, and first and second spaced end caps connected to the opposite ends of said insulation tube;



said insulation tube being disposed within said tank with its axis extending in a vertical direction;

said first end cap being mechanically connected to said plurality of interrupters; said second end cap being connected to said support platform, whereby said interrupters are mechanically supported from said platform, and are electrically insulated from said tank;

and means connecting the interior of said insulation tube to said high pressure supply, whereby said insulation tube is at a relatively high pressure; the interior volume of said insulation tube being sufficiently large to store relatively high pressure gas in sufficient amount for at least one gas blast operation of said plurality of interrupters.

3,889,084

CONTACT FOR HIGH VOLTAGE GAS BLAST CIRCUIT BREAKER WITH TIME-DELAYED OPENING

Leonard J. Kucharski, Harleysville, Pa., assignor to I-T-E Corporation, Spring House, Pa.

Filed Sept. 19, 1973, Ser. No. 398,870
Int. Cl. H01h *33/42*
U.S. Cl. 200—148 R **8 Claims**

1. In a circuit interrupter;

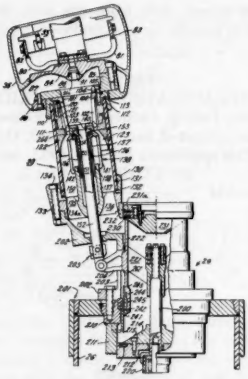
a generally tubular stationary contact, one end of said generally tubular contact being segmented in an axial direction to define a generally circular cluster of contact fingers;

a generally tubular movable contact movable into and out of engagement with said stationary contact, one end of said generally tubular movable contact being segmented in an axial direction to define a generally circular cluster of contact fingers, the opposite end of said movable contact being a generally solid ring;

said tubular stationary and movable contacts being coaxial; said solid ring end of said movable contact being movable into engagement with surfaces of said circular cluster of contact fingers of said stationary contact and having a

diameter different than the diameter defined by said surfaces of said cluster of stationary contact fingers when they are unflexed, thereby to create a given contact pressure when said movable and stationary contacts are in engagement;

and a generally stationary conductive tube supported in insulated relation with respect to said stationary contact; said tubular movable contact being coaxial with respect to said stationary conductive tube and being in sliding contact engagement therewith; said segmented movable contact fingers engaging a surface of said conductive tube; said conductive tube having a diameter different than the diameter defined by the engaging surfaces of said movable contact fingers when they are unflexed, thereby to create a given contact pressure when said movable contact slides relative to said conductive tube;



a longitudinally movable operating shaft connected to said tubular movable contact and being movable along the axis of said tubular movable contact to move said movable contact into and out of engagement with said stationary contact;

a lost-motion connection means for connecting said operating shaft to said movable contact;

and gas blast means operatively connected to said operating shaft and operable for producing a blast of gas between said stationary and movable contacts during their movement to a disengaged position;

and wherein said lost-motion connection means delays the time at which said movable contact moves to said disengaged position until after said gas blast means produces a blast of gas whereby increased gas pressure is established in the region of engagement of said movable and stationary contacts before said contacts are opened.

3,889,085

REST MECHANISM FOR MANUALLY OPERATED NUMBER WHEELS CARRYING INDICIA TAPE

Joseph LaRue Lockard, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

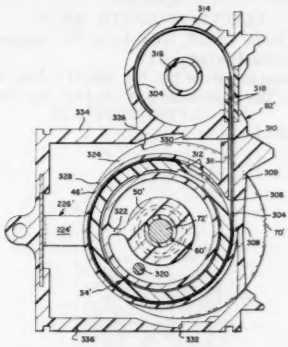
Division of Ser. No. 351,944, April 17, 1973, Pat. No. 3,818,155, which is a continuation-in-part of Ser. No. 262,394, June 13, 1972, abandoned. This application Jan. 30, 1974, Ser. No. 438,099

Int. Cl. H01h *3/58*

U.S. Cl. 200—153 R **2 Claims**

1. A resettable thumb wheel assembly, comprising:

a housing, a thumb wheel mounted for rotation in the housing, a clutch wheel, gearing means coupling aiaid thumb wheel to said clutch wheel, resilient means urging said clutch wheel into engagement with said gearing means, a tape having indicia thereon reeled over said number wheel, and reset means engageable with said clutch wheel and forcibly displaceable against said clutch wheel to displace said clutch wheel against the action of said resilient means, thereby disengaging and uncoupling said clutch wheel from said gearing means to permit independent rotation of said clutch wheel and the number wheel



thereon to reel said tape over the periphery of said number wheel which rotates with said clutch wheel independently of rotation of said thumb wheel, said thumb wheel being rotatable manually to rotate said clutch wheel and said number wheel to unreel said tape from said number wheel.

3,889,086

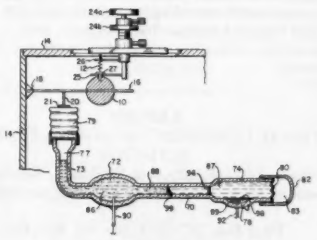
TRANSDUCERS UTILIZING ELECTROCAPILLARY ACTION

Arsene N. Lucian, P.O. Box 300, Manasquan, N.J. 08736

Continuation-in-part of Ser. No. 301,268, Oct. 2, 1972, Pat. No. 3,825,709, which is a continuation-in-part of Ser. No. 37,965, May 18, 1970, Pat. No. 3,701,868. This application July 1, 1974, Ser. No. 484,620

Int. Cl. H01h *29/06*

U.S. Cl. 200—192 **19 Claims**



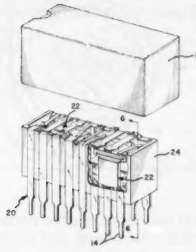
1. An electrocapillary transducer comprising an envelope including a tube portion having capillary transverse interior dimensions, a metallic liquid contained within said envelope and extending into said tube portion, a liquid electrolyte contained within said envelope and extending into said tube portion, said metallic liquid and said electrolyte being immiscible in each other and forming a single interface only in said capillary tube, electrode means respectively in electrical contact with said metallic liquid and said electrolyte, means external of said envelope for applying a force across said metallic liquid and said electrolyte effective to move the interface of said liquids and to change the interfacial tension between said liquids to produce a voltage at said electrodes due to the electrocapillary effect, said means including means for sealing

off an end of said envelope, a suspended mass responsive to vibrations to cause movement thereof for producing corresponding movement of said sealing means, and a material between said sealing means and one of said liquids for transmitting the force to the said one liquid.

3,889,087
ELECTROMAGNETIC RELAY

Norwood Claude Graeff, Harrisburg, Pa., assignor to AMP Incorporation, Harrisburg, Pa.

Continuation-in-part of Ser. No. 306,112, Nov. 13, 1972, abandoned. This application Sept. 20, 1973, Ser. No. 399,021
Int. Cl.[2] H01H *1/24, 1/26*
U.S. Cl. 200—246 **9 Claims**



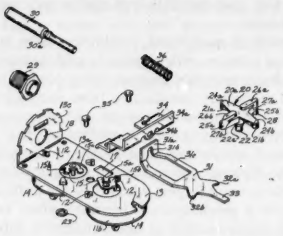
1. A contact-lead frame stamped and formed from a coplanar sheet of conductive material, comprising:
   a. a plurality of contact members positioned on one or another of two parallel, spaced apart elongated side strips, said members including,
      i. a first contact member having an inner end forming a first fixed contact;
      ii. a second contact member positioned on the same side strip as the first contact member and having a inner end consisting of a laterally projecting tab forming a second fixed contact, said second fixed contact being spaced above the plane of the first fixed contact, and
      iii. a movable contact member positioned on the other side strip opposite said first and second contact members and having an inner end forming a movable contact arm extending to and adapted for contacting said first and second fixed contacts; and
   b. means for connecting said contact members to electrical circuits.

3,889,088
ELECTRICAL COMPONENT WITH PUSH-PUSH SWITCH ACTUATOR

John Zdanys, Edwardsburg, and William L. Kelver, Cassopolis, both of Mich., assignors to CTS Corporation, Elkhart, Ind.

Filed Dec. 21, 1973, Ser. No. 427,421
Int. Cl. H01h *13/60*
U.S. Cl. 200—330 **13 Claims**

1. In an electrical component, the combination of a mounting bracket provided with a pair of openings, a pair of rotary switches fixedly secured to the mounting bracket, actuating means carried by each of the switches and extending through the openings in the mounting plate, one of the actuating means being 180° out of phase to the other of the actuating means, a star cam pivotally secured to the mounting bracket between the switches and cooperable with the actuating means, the star cam comprising a pair of laterally spaced fingers extending toward each other and defining a pair of slots, a drive actuator engageable with the star cam and movable in the slots defined by the fingers, and a shaft supported by the bracket and interconnected with the drive actuator whereby initial axial movement of the shaft causes the drive actuator to engage one of the fingers of the star cam and further axial movement of the shaft pivots the star cam until

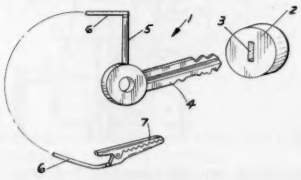


the actuating means shift from the first switch position through a labile position to a second switch position.

3,889,089
OPERATION ACTUATED IGNITION-KILL DEVICE

Allen J. Tomlin, 1506 S. Chister Dr., Shreveport, La. 71055

Continuation-in-part of Ser. No. 301,427, Oct. 27, 1972, abandoned. This application Dec. 26, 1973, Ser. No. 428,438
Int. Cl. H01h *27/06*
U.S. Cl. 200—334 **4 Claims**



1. An ignition-kill device for use in a key-operated boat comprising;
   a. a tension member attached in essentially vertical relationship to the key of said key-operated boat;
   b. a flexible member attached to the free end of said tension member;
   c. means attached to the free end of said flexible member for securing said free end of said flexible member to the operator of said boat; and
   d. a ring attached to said boat and located between said key and said means attached to the free end of said cable, said cable being positioned through said ring.

3,889,090
INDUCTION HEAT COOKING APPARATUS

Raymond W. Mackenzie, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 370,253, June 15, 1973, abandoned, which is a continuation of Ser. No. 243,713, April 13, 1972, abandoned. This application Nov. 15, 1973, Ser. No. 416,327
Int. Cl. H05b *5/04*
U.S. Cl. 219—10.49 **7 Claims**

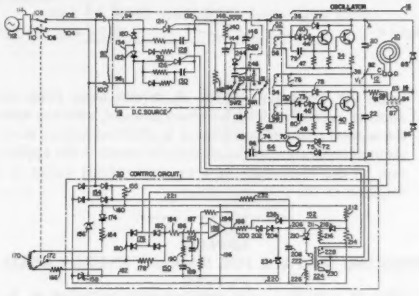
1. In apparatus for heating a cooking utensil by magnetic induction and operative with DC power supply lines, said apparatus comprising the combination of:
   induction coil means adapted to be coupled to cooking utensil;
   series resonant circuit means including coil means;
   DC power supply means including said DC power supply lines for supplying power to said induction coil means;
   switching means connected to said DC power supply lines for converting DC power to AC power, and for energizing said series resonant circuit means;

means connected to said induction coil means and to said DC power supply lines for providing a signal representative of voltage excursions of said induction coil means under resonance condition of operation beyond the voltage level of said DC power supply lines;

means for controlling the voltage level of said DC power supply lines in response to said signal, wherein said signal comprises a component that is a non-linear function of the Q of said induction coil means;

said means for controlling being adapted to lower said DC voltage level in response to said signal when the Q of said induction coil means increases; and

means responsive to the Q of said induction coil means and operative beyond a predetermined high value of said Q to modify said signal for providing continued operation of the apparatus.



5. In an induction heat cooking apparatus comprising a resonant circuit having a frequency in the ultrasonic range including a heating coil and capacitor means connected in series resonance with the inductance of said heating coil, a source of DC power for supplying energy to said heating coil, switching means consisting of first and second power transistor means connected to said DC source and transformer means responsive to said resonant circuit for feeding back current to drive said first and second power transistor means reciprocally in the switching mode at the frequency of resonance of said heating coil, said apparatus further comprising phase shifting means connected between the input of said transformer means and the output thereof for synchronizing the response of said first and second power transistor means to said frequency of resonance by introducing a phase advance between operation of said resonant circuit and driving of said first and second power transistor means to compensate for inherent slowness in response of said first and second power transistor means.

3,889,091

ELECTRONIC OVEN WITH A COOKING TIME SETTING MECHANISM AND A REMAINING TIME INDICATION MECHANISM

Teruo Ishikawa, Fuji, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Tokyo, Japan

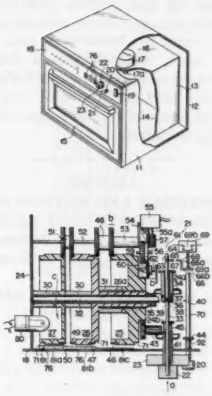
Filed Feb. 6, 1974, Ser. No. 440,034

Claims priority, application Japan, June 4, 1973, 48-62679; June 22, 1973, 48-70589; Feb. 10, 1973, 48-17908; June 22, 1973, 48-74222; June 22, 1973, 48-74225

Int. Cl. H05b *9/06*

U.S. Cl. 219—10.55 E **6 Claims**

1. An electronic oven comprising a housing provided with a heating chamber and heating time indicating windows, a high-frequency oscillator, second and minute time unit setting shafts provided in the housing to be rotatable about the longitudinal axis thereof and movable in an axial direction, rotatable second and minute indication bodies associated with each other so that a remaining heating time is displayed through the heating time indicating windows, connecting means operatively connecting the time setting shafts to the time indication bodies to cause the time indication bodies to be rotated an amount corresponding to the extent of rotation involved when the time setting shafts are rotated from an original position after an axial movement, and adopted to cut off the operative connection between the time indication bodies and the time setting shafts when the time setting shafts are returned to the



original position, a starting shaft provided in the housing to be movable in an axial direction, means adapted to return the time setting shafts to the original position when the time starting shaft is moved, means for causing the high-frequency oscillator to be operated when the starting shaft is moved, and a timer motor causing the time indication bodies to be rotated by said amount in a reverse direction when the starting shaft is moved.

3,889,092

APPARATUS FOR SELECTIVELY MACHINING INTERFITTING PARTS

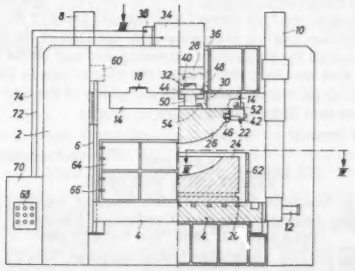
Gustav Adolf Hessmert, Ludenscheid, Westfalen, Germany, assignor to Gustav Hessmert K.G., Ludenscheid, Germany

Filed June 11, 1973, Ser. No. 368,466

Claims priority, application Germany, June 29, 1972, 2231800

Int. Cl. B23p *1/08*

U.S. Cl. 219—69 R **7 Claims**



1. Apparatus for selectively machining first and second interfitting parts by mechanical means and spark-erosion means comprising, in combination, a supporting frame, first support means for said first part, means movably mounting said first support means upon said frame for transfer of said first support means between a first mechanical machining

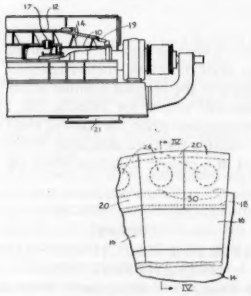
means access position and a second spark-erosion machining position, second support means for said second part, means movably mounting said second support means on said frame for transfer of said second support means toward and away from said first support means when in said second position, and movable between a first mechanical machining means access position and a second spark-erosion machining position, said first and second support means being aligned with each other when in said second position, motor means mounted on said frame operatively connected to said first and second support means for transferring said first and second support means upon their associated movable mounting means, and spark-erosion means electrically connectable to said parts whereby said parts may be machined by spark-erosion when said first and second support means are in said second machining positions.

3,889,093

HARDFACED MEMBER AND METHOD OF ATTACHING HARDFACING ELEMENT THERETO

William E. Fawcett, Latrobe, and William D. Armbrust, Greensburg, both of Pa., assignors to Kennametal Inc., Latrobe, Pa.

Filed Jan. 23, 1974, Ser. No. 435,682
Int. Cl. B23k *9/04*
U.S. Cl. 219—77 **16 Claims**



1. A method of securing a first member to a second member with said members having parallel opposed faces of substantial area in engagement, said first member being steel and said second member being a cemented hard metal carbide, said second member being in the form of a plate having a thickness which is a fractional part of any lateral dimension thereof, said method comprising; forming recess means in the first member through said one face thereof, placing said faces of the members together, placing plug means on said face of the second member with the plug means extending into said recess means in said first member, and brazing the plug means to the face of said second member and to the periphery of the said recess means in said first member.

3,889,094

RESISTANCE WELDING

James C. Needham, Saffron Walden, England, assignor to The Welding Institute, Abington, Cambridge, England

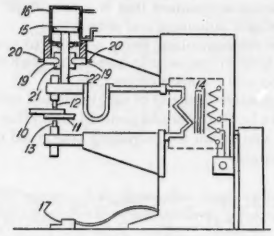
Filed May 19, 1969, Ser. No. 825,586
Claims priority, application United Kingdom, May 22, 1968, 24476/68
Int. Cl. B23k *11/16*
U.S. Cl. 219—89 **4 Claims**

1. Apparatus for joining workpieces by resistance welding, comprising:

a pair of electrodes, at least one electrode being movable to permit the clamping of superimposed workpieces to be joined between the electrodes;

a source of current for connection across the electrodes; and

mounting means for the electrodes providing a first compliance in response to small displacements of the electrodes away from one another and a second reduced compliance



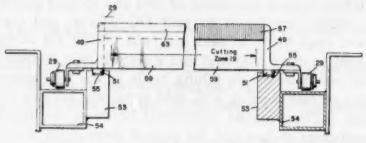
when the movement of the electrodes away from one another exceeds a predetermined amount, whereby when the second reduced compliance is effective further movement of separation of the electrodes results in the application to the electrodes of a pressure which varies as a function of the said separation.

3,889,095

WORKING SURFACE FOR RADIANT ENERGY BEAM CUTTER

Georgette S. Egan, Granada Hills, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Division of Ser. No. 218,896, Jan. 19, 1972, Pat. No. 3,811,554. This application Mar. 8, 1973, Ser. No. 339,661
Int. Cl. B23k *27/00*
U.S. Cl. 219—121 L **1 Claim**



1. A material handling system for a radiant energy cutter comprising in combination:

a. a periodically advancing working surface for supporting and advancing material being cut by a focused beam of radiant energy directed toward said surface, said surface including:

1. a plurality of slats, each including

A. an elongate, heat conductive honeycomb core having an open top surface, a pair of long parallel sides and a pair of shorter ends; and

B. a support member extending along and attached to, each of said sides, each support member having a tapered edge nearest said top surface;

2. means operatively connected to said slat ends to connect said slats into an endless belt in which the support members of adjacent slats extend in closely spaced-apart parallel relationship, said support members being further characterized in that the included angle between the tapered edges of adjacent support members is sufficiently sharp to prevent reflection of said radiant energy back toward said working surface; and

3. means for periodically advancing said belt along a plane, the top surfaces of said slats in said plane forming said working surface;

b. means for supporting a bolt of said material rotatably near the upstream end of said surface;

c. means for guiding said material from said bolt onto said surface; and

d. means for turning said bolt periodically so as to dispense material from said bolt onto said surface at the same linear rate as that at which said surface advances.

3,889,096
ELECTRIC SOLDERING IRON DELIVERING HEAT BY CHANGE OF STATE OF A LIQUID HEAT TRANSPORTING MEDIUM

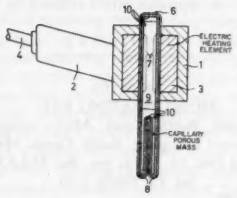
George Albert Apolonia Asselman, and Adrianus Petrus Dirne, both of Emmasingel, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 160,732, July 8, 1971. This application Feb. 22, 1973, Ser. No. 334,866

Claims priority, application Netherlands, July 11, 1970, 7010304

Int. Cl. H05b *1/00;* **B23k** *3/04;* **F28d** *15/00*

U.S. Cl. 219—229 **3 Claims**



1. A soldering device comprising a holder, at least one hollow and closed soldering element supported by said holder, a heating place formed by a first heat transmission wall located at one point on said soldering element at which point heat can be supplied to said soldering element, at least one hollow soldering tip located at an end of said element formed by at least one second heat transmission wall located at a different point on said soldering element at which point heat can be delivered by said soldering element for performing a soldering operation, a source of heat supported by said holder positioned for supplying heat to said first heat transmission wall of said soldering element, means connected to said heating source for causing it to produce thermal energy, a vaporizable liquid heat transporting medium carried within and partially filling said soldering element for absorbing heat from said source of heat through said first heat transmission wall so that said medium will thereby change from the liquid phase to the vapor phase and will supply heat to the second heat transmission wall and thereby change from the vapor phase back to the liquid phase, and a capillary mass of porous material for providing capillary action contained within said soldering element and extending continuously between said first and second heat transmission walls so that said heat transporting medium in the liquid phase after condensation from the vapor phase can flow back from the second to the first heat transmission wall as a result of capillary action.

3,889,097
PERMANENT WAVING MACHINE

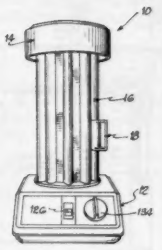
John R. Forsberg, Arlington Heights, Ill., assignor to Helene Curtis Industries, Inc., Chicago, Ill.

Filed July 26, 1973, Ser. No. 382,886

Int. Cl. H05b *1/02;* **A45d** *4/00*

U.S. Cl. 219—242 **3 Claims**

1. A permanent waving machine comprising a base housing, an elongate vertically positioned tubular heater element and a cap assembly, the tubular heater element comprising a tubular wall and a plurality of enlarged elongate heater fins extending outwardly from said tubular wall, said base housing, tubular wall and cap asseembly providing a substantially enclosed heating chamber, means securing said cap assembly to the upper end of said tubular heater element and means securing the lower end of said tubular heater element to said base housing and supporting said tubular heater element for rotation relative to said base housing, and a resistance heater mounted on said base housing and extending upwardly therefrom into said tubular heater element and out of contact with its interior for tubular heating said heater element and said heater fins, said tubular heater element being an extrusion in which each of said heater fins is integrally connected to said



tubular wall by a spacer rib which extends outwardly from said tubular wall, said heater being controlled by an operating thermostat and a control thermostat in parallel with each other, the operating thermostat being located within said base housing and set at a specified temperature, and the control theremostat being located within said heater element and set at a temperature higher than said specified temperature, said cap assembly being non-rotatably secured to said tubular heating element and including a handle to rotate said heater element relative to said base housing.

3,889,098
SWITCHING DEVICE HAVING CONTACTS OF TWO OR MORE LAYERS

Anthony Steinmetz, Hilversum, Netherlands, and Hidde Walstra, Attleboro, Mass., assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 3, 1974, Ser. No. 466,713

Claims priority, application Netherlands, May 9, 1973, 7306445

Int. Cl. H01h *1/02*

U.S. Cl. 200—268 **2 Claims**

1. A switching device having moving contacts of which at least the contact surface is clad with a contact coating which consists of at least two layers, characterized in that the inner layer having a thickness of at least 0.5 /μm of a metal having a melting point of more than 1800°C on which an interrupted or uninterrupted layer having a thickness of 0.01 – 1 /μm is present which layer consists of a metal or a metal alloy having a melting point of less than 500° C.

3,889,099
DOOR COOLING SYSTEM

James J. Nuss, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

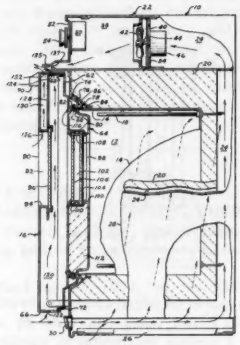
Filed July 31, 1974, Ser. No. 493,332

Int. Cl. F27d *11/02*

U.S. Cl. 219—393 **3 Claims**

1. An oven having a cooking cavity formed by a box-like oven liner and a front-opening access door, heating means for applying heat energy to the cooking cavity, thermal insulating means surrounding the oven liner and also included within the said door for retaining the oven heat within the cooking cavity, an outer oven cabinet surrounding the insulated oven liner, cooling air channels formed within the oven cabinet around the oven liner as well as within the door for reducing the outer surface temperatures of the cabinet and door as room ambient air flows through the air channels, the door

having air inlet openings along its bottom edge and air outlet openings along its top edge to create a vertical flow of natural convection air currents, the outer oven cabint having air inlet means for introducing air into the cooling air channels of the cabinet, blower means located in the oven cabinet for producing a forced draft of air in the air channels within the oven



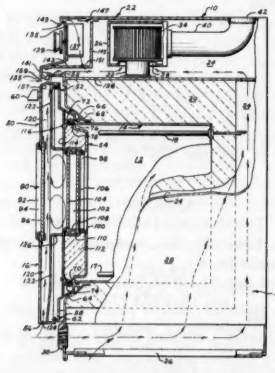
cabinet; the invention comprising a converging exhaust nozzle communicating with the top air channel of the oven cabinet to overlie the top edge of the door and sweep a high velocity curtain of exhaust air over the air outlet openings in the door and thus reduce the static pressure at the air outlet openings of the door so as to asprirate air up through the door for an increased reduction in outer surface temperatures of the door.

3,889,100

OVEN VENTILATING SYSTEM

Raymond L. Dills, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed July 31, 1974, Ser. No. 493,333
Int. Cl. F27d *11/02*
U.S. Cl. 219—393 **5 Claims**



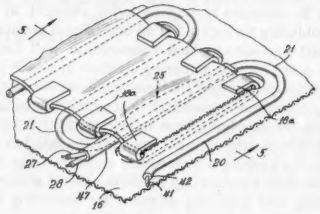
1. An oven having a cooking cavity formed by a box-like oven liner and a front-opening access door, heating means for supplying heat energy to the cooking cavity, thermal insulating means surrounding the oven liner and also included within the said door for retaining the oven heat within the cooking cavity, an outer oven cabinet surrounding the insulated oven liner, cooling air channels formed within the oven cabinet around the oven liner as well as within the door for reducing the outer surface temperatures of the cabinet and door as room ambient air flows through the air channels, the door having air inlet openings along its bottom edge and air outlet openings along its top edge to create a vertical flow of natural convection air currents, the outer oven cabinet having air inlet means for introducing air into the cooling air channels of the cabinet, and an oven control panel located above the oven door and mounted on the oven cabinet; the invention comprising a suction fan located in the air channel above the oven liner and behind the control panel for drawing air up through the air channels within the oven cabinet, said top air channel also having air inlet means beneath the control panel and generally in alignment with the air outlet openings in the top edge of the door, a constriction formed in the door gap above the top edge of the door a slight amount forward of the air outlet openings in the door so as to increase the velocity of ambient air flow over the top edge of the door and thereby reduce the static pressure just above the said air outlet openings in the door so that the vertical air flow through the door is augmented by an aspirator effect created by the said constriction.

3,889,101

MOIST HEATING PAD

Thomas G. Woods, Battle Creek, Mich., assignor to Battle Creek Equipment Company, Battle Creek, Mich.

Filed Oct. 15, 1974, Ser. No. 514,633
Int. Cl. H05b *3/36*
U.S. Cl. 219—527 **10 Claims**



1. A moist heating pad comprising:

a. a flexible moisture permeable base sheet,

b. an electrical resistance wire heating element having an insulation sleeve mounted on said flexible base in a pattern comprising a plurality of substantially parallel banks of backward and forward sinuous loops having straight portions substantially perpendicular to the longitudinal direction of said banks,

c. at least one thermostat encased in an insulation jacket connected in series with said heating element and connected at both of its ends by insulated lead wires of a highly conductive metal, said thermostat being positioned parallel and in close proximity to a straight portion of one loop of said heating element,

d. a plurality of strips of a water absorption lead alloy mounted on said flexible base sheet each within one of said sinuous loops,

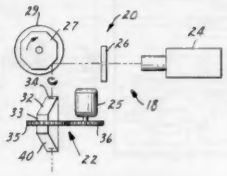
e. an electrical line cord having a switch therein being electrically connected to said heating element, and

f. a flexible moisture permeable cover enclosing said flexible base sheet, said heating element, said metal strips and said thermostat.

3,889,102
OFF-AXIS CIRCULAR COORDINATE OPTICAL SCANNING DEVICE AND CODE RECOGNITION SYSTEM USING SAME

John C. Dahlquist, Roseville, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Nov. 2, 1973, Ser. No. 412,174
Int. Cl. G06k *7/10*
U.S. Cl. 235—61.7 R **16 Claims**



1. An optical scanning device comprising (i) line scanning means for producing a light beam in at least one planar scan and (ii) angular scanning means comprising

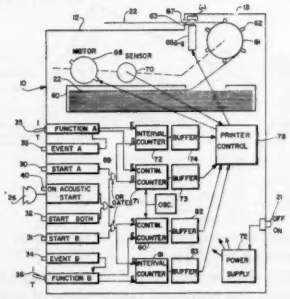
an optical inversion member having an optical axis and at least one face intercepting said axis, said member being positioned so that said intercepting face intercepts at least one planar scan off said optical axis, and

means for rotating the member about its optical axis to precess each off-axis intercepted planar scan which is transmitted by the member so that the transmitted scan upon impinging a plane normal to said axis defines an area bounded by two closed curves.

3,889,103
ELECTRONIC TIMER PRINTER

Lewis B. Russell, 1469 N. Glassell, and William F. Kelly, 745 N. Lemon, both of Orange, Calif. 92667

Filed July 5, 1973, Ser. No. 376,626
Int. Cl. G06K *1/12*; **G06F** *7/38*; **G08B** *25/00*
U.S. Cl. 235—61.9 A **17 Claims**



1. An electronic timer-printer comprising:

a source of timing signals

a counter connected to said source of timing signals for counting signals from said source;

a switch for starting said counter;

a second switch for reading the count of said counter;

a signal storage device;

means responsive to the operation of said second switch for reading signals from said counter to said signal storage device;

a printing device including a motor, a drive roller for advancing a web having printed thereon digital indicia;

a sensor coupled to said drive roller for sensing the longitudinal position of said web;

means responsive to different positions of said web for encoding said positions in the same code as signals contained in said storage device;

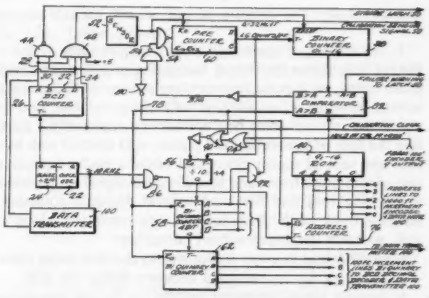
means responsive to the reading of information from said counter and storage in said pulse storage means for energizing said motor;

and comparator means responsive to the same code in said storage device as encoded by said position sensor and encoding means for enabling said printing means to produce an identifiable indication on said web.

3,889,104
ALTITUDE DIGITIZER

Philip L. Smith, Richmond, Va., assignor to Aero Industries, Inc., Sandston, Va.

Filed Apr. 8, 1974, Ser. No. 459,206
Int. Cl. G01l *9/12*; **H03k** *13/24*
U.S. Cl. 235—150.2 **13 Claims**



1. An electrical circuit for providing a digital output signal to an aircraft transponder comprising:

means for producing a pulse train having a frequency which varies as a function of altitude,

gating means for producing a signal defining a first gating period in which pulses from said producing means are counted and a second gating period in which counted pulses are employed to generate said digital output signal,

counter means connected to said gating means and to said producing means for receiving and accumulating a count of pulses from said producing means during said first gating period,

a read only memory having a plurality of output states each indicative of a count and corresponding to an address which is associated with a given number of first foot increments of altitude,

comparator means connected to said read only memory and to said counter means for providing a first output when the count in said counter means exceeds an applied output state of said read only memory and a second output when the count in said counter is equal to or less than the applied output state of said read only memory, addressing means connected to said gating means and said read only memory for successively applying different addresses to said read only memory, during said second gating period, to cause said read only memory to apply successive output states associated with increasing numbers of first increments to said read only memory, and

output gate means connected to said addressing means for producing a digital signal from the address applied to said read-only memory after said comparator means shifts to said second output state.

3,889,105

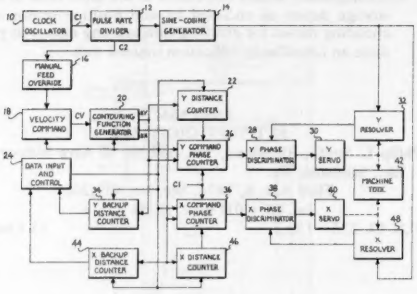
AUTOMATIC BACK UP OF A NUMERICAL CONTROL

Ulrich H. Schneekloth, Waynesboro, Va., assignor to General Electric Company, Salem, Va.

Filed Aug. 20, 1974, Ser. No. 499,265

Int. Cl. G05b *19/36, 19/18*

U.S. Cl. 235—151.11 **3 Claims**



1. An improved numerical contouring control of the type having a function generator for generating first and second pulse trains, each pulse representing a commanded increment of motion along a first and second orthogonal axis, said function generator including first and second counters for controlling the rate of generating the pulses, said control also having first and second motor command circuits each responsive to one of said pulse trains and to a direction signal for positioning a machine tool and first and second distance counters for keeping track of the distance to be commanded, along each axis, wherein the improvement comprises:

a. first backup counter responsive to the first pulse train for counting the commanded distance along one axis;

b. second backup counter responsive to the second pulse train for counting the commanded distance along the other axis;

c. control means responsive to a signal indicating that the control is in a backup mode for reversing the motor command direction signals and for reversing the counting direction of the function generator counters, the distance counters and the backup counters; and

d. logic means for sensing a count in the first and second back up counters and automatically ending the backup mode of operation.

3,889,106

METHOD AND SYSTEM FOR NUCLEAR POWER PLANT SYNCHROSCOPE SIMULATION FOR OPERATOR TRAINING

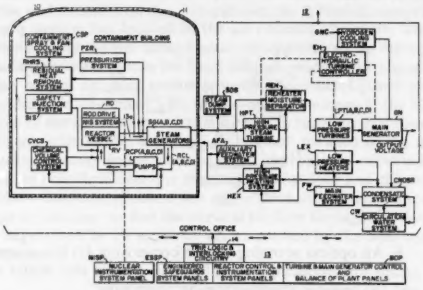
William H. Alliston, Murrysville, and Steven J. Johnson, McKnight Rd., both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 14, 1973, Ser. No. 341,181

Int. Cl. G06f *15/06, 15/56;* **G06b** *9/00*

U.S. Cl. 235—151.21 **14 Claims**

1. A system for the dynamic simulation of the real-time operation of a nuclear power plant, comprising a plurality of manually operable devices for remotely operating simulated plant devices, including varying a simulated alternating current voltage output frequency, a plurality of indicating devices for monitoring the operation of the simulated plant including synchroscope indicating means for comparing the frequency and phase of an alternating voltage on isolated electrical conductors, first means to generate physical values relating to the voltage frequency output of a first simulated electrical generating source in accordance with values relating to the operation of predetermined manually operable devices, second means to generate physical values relating to the voltage frequency output of a second electrical generating source, third means to generate a third physical value in accordance with the difference between the first and second physical values, means responsive to the third physical value to generate an analog signal representative of the third physical value, means to generate an alternating current voltage having a



frequency representative of the value of the analog signal, means to apply a reference alternating voltage to the synchroscope indicating means, and means responsive to the generated frequency and the reference frequency to operate the synchroscope indicating means in accordance with the third physical value to monitor the difference frequency between the isolated electrical conductors in accordance with the speed of rotation of the synchroscope indicating means.

3,889,107

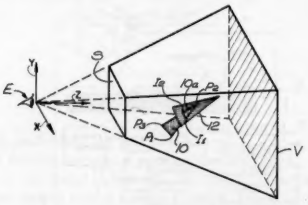
SYSTEM OF POLYGON SORTING BY DISSECTION

Ivan E. Sutherland, Salt Lake City, Utah, assignor to Evans & Sutherland Computer Corporation, Salt Lake City, Utah

Continuation-in-part of Ser. No. 298,084, Oct. 16, 1972, Pat. No. 3,816,726. This application Sept. 27, 1973, Ser. No. 401,479

Int. Cl. G06f *7/38, 15/20*

U.S. Cl. 235—152 **9 Claims**



1. A method for processing data in relation to a volume of space comprising the steps of:

representing data in the form of electrical signals manifesting objects and positional relationships of said objects in said volume of space;

defining a selected viewpoint in relation to said volume of space;

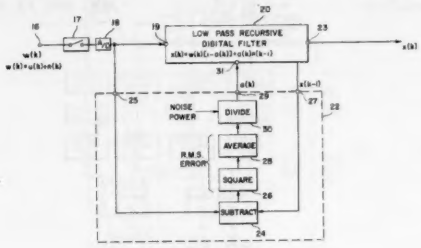
selectively defining a specific plane in terms of electrical signals, from various possible planes lying in said volume of space, said specific plane being related to one of said objects, said possible planes including planes extending transverse to the axis of said selected viewpoint; and

testing said electrical signals manifesting objects and positional relationships of said objects in said volume of space in relation to said specific plane to generate signals that are definitive of data representing said objects on each side of said specific plane.

3,889,108
ADAPTIVE LOW PASS FILTER

Ben H. Cantrell, Oxon Hill, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 25, 1974, Ser. No. 491,890
Int. Cl. G06f *15/20;* **H03g** *5/24*
U.S. Cl. 235—152 **4 Claims**

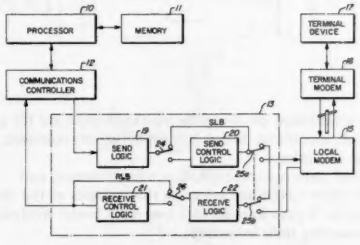


1. An adaptive filter having a bandwidth responsive to a change of condition of an input signal comprising:
an adjustable response characteristic digital filter having a control terminal; and
control means coupled between the input and output of said digital filter and connected to said control terminal, said control means providing a signal to control said digital filter, said control signal being formed by the ratio of the expected noise-power of said input signal divided by a function of said input signal and the prior output signal of said digital filter.

3,889,109
DATA COMMUNICATIONS SUBCHANNEL HAVING SELF-TESTING APPARATUS

Ronald W. Blessin, Phoenix, Ariz., assignor to Honeywell Information Systems Inc., Phoenix, Ariz.

Filed Oct. 1, 1973, Ser. No. 402,247
Int. Cl. G06f *11/00*
U.S. Cl. 235—153 AK **4 Claims**

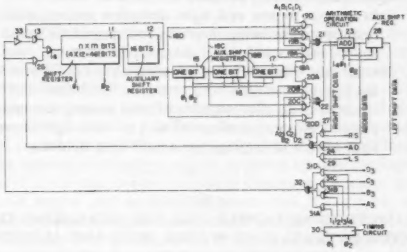


1. A data communications subchannel having self-testing apparatus for use with a processor, and a communications controller, a source of message characters connected to said controller and a modem, said subchannel comprising:
send logic, said send logic being coupled to said controller;
send control logic;
means for selectively connecting said control logic between said modem and said send logic, said send control logic and said send logic transferring characters from said controller to said modem when said send control logic is connected between said modem and said send logic;
receive logic;
means for selectively connecting said receive logic to said send control logic in a wrap-around test mode;
switch means responsive to test mode control signals from said processor for selectively bypassing said send control logic and thereby test for possible defects in said send control logic in said wrap-around test mode;
receive control logic;
means for selectively connecting said receive logic between said modem and said receive control logic, said receive logic and said receive control logic transferring characters from said modem to said controller when said receive logic is connected between said modem and said receive control logic;
switch means responsive to test mode control signals from said processor for selecting bypassing said receive control logic and thereby test for possible defects in said receive control logic in said wrap-around test mode; and
means for connecting said receive control logic to said controller.

3,889,110
DATA STORING SYSTEM HAVING SINGLE STORAGE DEVICE

Masayuki Hakata, Iruma, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Feb. 28, 1973, Ser. No. 336,502
Claims priority, application Japan, Mar. 3, 1972, 47-022086
Int. Cl. G06f *7/38*
U.S. Cl. 235—176 **8 Claims**

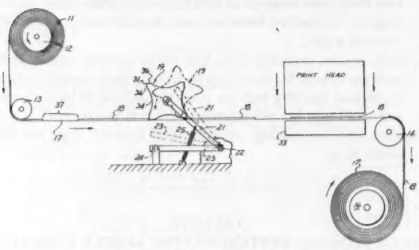


1. A memory device for storing a plurality of data items, each data item having a plurality of binary coded decimal digits, said memory device comprising:
a single storage means;
control means coupled to said single storage means and responsive to said data items for causing combined digits sequentially arranged from a lower order combined digit to a higher order combined digit to be stored in said single storage means, each combined digit being formed under control of said control means which includes means for combining the same order digits of the data items and forming a plurality of bit groups sequentially arranged from a lower order bit group to a higher order bit group, each bit group comprising sequentially arranged same order bits of the same order digits of the data; and
read-out means coupled to the output of said storage means for selectively reading out any given item of the data stored in said storage means by selectively reading out the bits constituting the given item of the data.

3,889,111
DEVICE FOR POSITIONING STOCK IN A PRINTING MECHANISM

James R. Moss, Mt. Clemens, Mich., assignor to The Bendix Corporation, Southfield, Mich.

Filed Dec. 26, 1973, Ser. No. 427,884
Int. Cl. H01j 5/16
U.S. Cl. 250—237 R 9 Claims



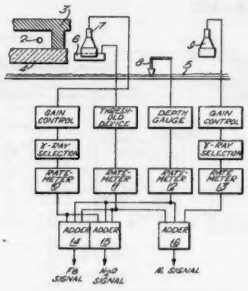
1. A device for sensing and positioning stock in a feed mechanism, said stock including edges spaced at selected positions to define positions at which an operation will occur in said feed mechanism comprising:
a sensing element arranged to slide along said stock and positioned to contact said edges, said sensing element having sharp portions in the vicinity of said contact so that said sharp portions contact said edges;
shaft means, said sensing element being rotatably mounted on said shaft means, said shaft means being pivotably mounted with respect to a fixed point;
light opaque fixedly coupled to said shaft means;
light source means and light detection means, said light opaque means being normally interposed with said light source means and said light detection means;
said sensing element being symmetrically configured about the point of rotation with respect to said shaft and being configured so that rotation of said sensing element displaces said opaque element and permits light from said light source to impinge upon said light detector.

3,889,112
METHOD AND APPARATUS FOR MEASURING THE CONCENTRATION OF WATER, IRON AND ALUMINUM IN IRON ORE BY NEUTRON RADIATION

Ralph John Holmes, South Yarra, New South Wales; Alan Wilson Wylie, Nunawading, New South Wales, and Kenneth Gordon McCracken, Roseville, New South Wales, all of Australia, assignors to Commonwealth Scientific and Industrial Research Organization, Campbell, Australian Capital Territory, Australia

Filed June 11, 1973, Ser. No. 368,785
Claims priority, application Australia, June 9, 1972, 9294/72
Int. Cl. G01t 1/16
U.S. Cl. 250—265 18 Claims

1. A method of quantative measurement of the concentration of water and a specific component in a material comprising the steps of
i. irradiating the material with neutrons,
ii. measuring the neutron flux in the region of the irradiated material,
iii. measuring the number of gamma rays characteristic of the specific component emitted per unit time from the material,
iv. measuring the differences between
a. the measured neutron flux and number of gamma rays and
b. known values of these parameters obtained from samples of the material having known concentrations of water and the specific component, and

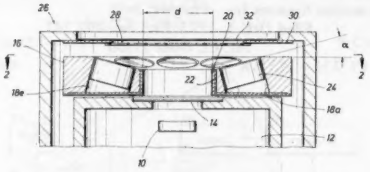


v. from the difference measurements, determining the concentration of water and the specific component in the material being examined.

3,889,113
RADIOISOTOPE-EXCITED, ENERGY-DISPERSIVE X-RAY FLUORESCENCE APPARATUS

John R. Rhodes, Austin, Tex., assignor to Columbia Scientific Industries, Inc., Austin, Tex.

Filed May 3, 1973, Ser. No. 356,830
Int. Cl. H01j 37/20
U.S. Cl. 250—272 16 Claims

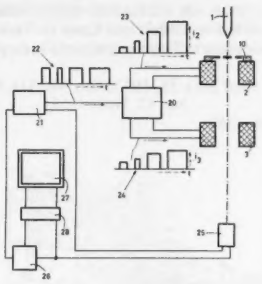


1. In a radioisotope X-ray fluorescence analyzer for analyzation of specimens in an atmospheric environment, said analyzer including
a sealed radioisotope excitation source means, and
a detection system for selecting the energies of the characteristic X-rays excited in a specimen under analysis and measuring their intensities,
the improvement, comprising
a first holder for the source means, said holder defining a plurality of receptacles disposed in annular array, said source means being a plurality of radioactive sources being disposed one within each of said receptacles,
a second holder for a detector in the detection system, said first and second holders being located on the same side of the specimen,
said first holder being encased in a helium-filled compartment having a window toward the specimen, the source being located at a distance in the range of 0.05 to 0.4 inch of said window and the specimen being positionable in the atmospheric environment on the side of said window opposite said source.

3,889,114
ELECTRON MICROSCOPE FOR DARK-FIELD ILLUMINATION

Karel Jan van Oostrum, Emmasingal, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 11, 1974, Ser. No. 449,844
Claims priority, application Netherlands, Mar. 28, 1973, 7304298
Int. Cl. H01j *37/26*
U.S. Cl. 250—306 **6 Claims**

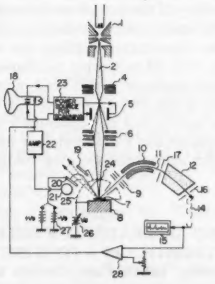


1. Electron microscope having an annular diaphragm which is arranged about an optical axis and serves to illuminate a specimen at an angle to the optical axis, characterized in that the electron microscope includes, viewed in the direction of propagation of the electron beam, after an electron source a first condenser lens and a second condenser lens for imaging the electron source on the specimen, in that the condenser system is provided with a supply source which is individually adjustable for each of the condenser lenses, and in that the annular diaphragm is disposed between the electron source and the second condenser lens.

3,889,115
ION MICROANALYZER

Hifumi Tamura, Hachioji, and Toshio Kondo, Sagamihara, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Mar. 16, 1973, Ser. No. 341,846
Claims priority, application Switzerland, Mar. 17, 1972, 26561/72
Int. Cl. H01j *37/26*
U.S. Cl. 250—307 **15 Claims**

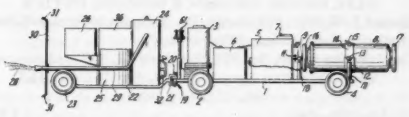


1. An ion microanalyzer comprising:
means for producing an ion beam;
means for scanning the surface of a specimen with said ion beam;
means for directly detecting a first portion of the secondary ions emitted from said specimen;
a cathode ray tube having means for scanning the electron beam thereof synchronously with the scanning of said ion beam;
a mass spectrometer for mass-analyzing a second portion of said secondary ions and for providing a signal representative of the mass-analysis;
means for modulating the intensity of the electron beam of said cathode ray tube by the detected signal from said means for directly detecting a first portion of the secondary ions emitted from said specimen; and
means for superimposing the signal obtained from said mass spectrometer on the signal obtained from said means for directly detecting a first portion of the secondary ions emitted from said specimen.

3,889,116
AUTOMATIC CARRIAGE FOR RADIOGRAPHING WELDINGS FROM THE INSIDE OF PIPELINES BY MEANS OF X-RAYS AND RELEVANT DEVICES

Arnaldo Gambini, San Donato Milanese, and Giacomo Capitelli, Milano, both of Italy, assignors to Snam-Progetti S.p.A., Milan, Italy

Continuation of Ser. No. 332,649, Feb. 15, 1973, abandoned.
This application Aug. 13, 1974, Ser. No. 497,064
Claims priority, application Italy, Feb. 17, 1972, 20661/72
Int. Cl. G03b *41/16*
U.S. Cl. 250—320 **7 Claims**



1. A device for radiographing weldings from the inside of a pipeline, said device adapted to be controlled by a permanent horseshoe magnet positioned on the exterior of said pipeline at a preselected distance from a welding to be inspected, comprising:
a carriage having self-adjusting wheels; a D.C. geared motor operative with said wheels for driving said carriage; an X-ray tube for longitudinal or panoramic radiography; means removably mounting said X-ray tube on said carriage; electronic programer means for operating said X-ray tube; means for stabilizing the voltage supplied to said X-ray tube at preselected levels; a power supply including an internal combustion engine mounted on said carriage and an electric energy generator operatively coupled to said engine and adapted to power said X-ray tube; a battery electrically coupled to said D.C. geared motor to drive said carriage and to said energy generator, such that said battery supplies power for starting said engine and is charged by said energy generator when the engine is running to maintain an operative charge; and a magnetic compass control sensor mounted on said carriage and adapted to be operated by said horseshoe magnet; said sensor being coupled to said programer means having three positions, a neutral position and two deflection positions, whereby the movement and radiography is controlled.

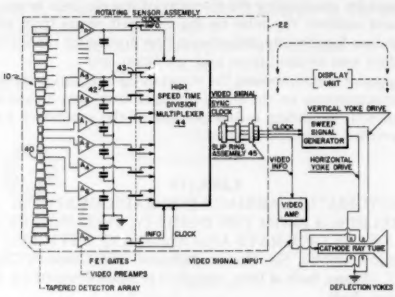
3,889,117
TAPERED DETECTOR SCANNING ARRAY SYSTEM

George W. Shaw, Jr., Cincinnati, Ohio, assignor to Cincinnati Electronics Corporation, Cincinnati, Ohio

Continuation of Ser. No. 138,456, April 29, 1971, abandoned.
This application May 3, 1973, Ser. No. 357,881
Int. Cl. G01t *1/00*
U.S. Cl. 250—332 **14 Claims**

1. An electro-optical system comprising a radiation sensitive detector array consisting of a series of discrete detector elements tapering outwardly from the mid-point to each end, means for scanning an optically focused scene on said array and means for electrically reproducing said scene on a display

device wherein the tapering orientation of said elements is accomplished approximately in steps by providing one group



of the smallest elements centrally of said array and progressively larger groups extending outwardly toward each end thereof.

3,889,118

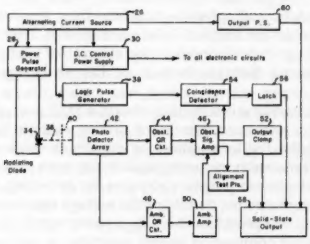
ELECTRONIC PRESENCE SENSING DEVICE

Edward J. Walker, Pittsburgh, Pa., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 370,160, June 14, 1973, abandoned. This application Apr. 18, 1974, Ser. No. 462,168

Int. Cl. H01j 1/00

U.S. Cl. 250—341 **1 Claim**



1. An electronic detection and control device compriing a first electronic circuit means having its input connected to an electrical source, the output of said first electronic circuit means connected to at least one radiation-emitting semiconductor device, said first electronic circuit means for providing electrical energy to said semiconductor device to excite said semiconductor device to produce a radiated signal, said radiated signal defining a radiating screen, a radiation sensing semiconductor device whose input receives said radiated signal, the output of said radiation sensing semiconductor device connected to a second circuit means, said second circuit means providing an output signal responsive to the presence or absence of an obstruction in said electronic screen, and responsive to the presence or absence of any ambient radiated energy received by said radiation sensing semiconductor device, said second circuit means providing an output signal responsive to an open or short condition in any of the components or circuits of said device and responsive to any failure of said electrical source, said first circuit means being further provided with a first electronic timing means whose output signal is synchronized with the output of a second electronic timing means, the input of said second electronic timing means being connected to said electrical source, said second circuit means having means to steer the output signal of said radiation-sensing semiconductor device and means to then amplify the steered signal, said second electronic timing means providing an output signal, said third electronic circuit means to electronically compare the time coincidence of the output signals of said second circuit means with the output signal of said second electronic timing means, said first electronic circuit means is a half-wave rectifier pulse generator whose frequency is developed from said electrical source.

3,889,119

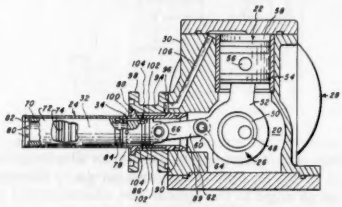
CRYOGENIC COOLER OFF-AXIS DRIVE MECHANISM FOR AN INFRARED RECEIVER

Stephen L. Whicker, Dallas, and Carol O. Taylor, Anna, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed June 25, 1973, Ser. No. 373,355

Int. Cl. G01t 1/16

U.S. Cl. 250—352 **5 Claims**



1. In an infrared receiver including an infrared detector in a scanning path for infrared energy emanating from a source thereof for producing electrical signals representative of impinging infrared energy; an electro-optical system coupled to the detector for processing video signals from the electrical signals produced by the detector; and a refrigerator for cooling the detector to an operating temperature, the refrigerator having a cooling member including a cylinder, a regenerator-displacer reciprocally mounted in the cylinder, and a cold chamber formed between an end of the cylinder and the regenerator-displacer, a housing enclosing a cylinder-piston type compressor motor and drive mechanism and a passage means interconnecting the compressor cylinder, regenerator-displacer, and cold chamber of the cooling member, said compressor cylinder, passage, regenerator-displacer, and cold chamber forming the working volume for a cryogen, the improvement comprising an off-axis drive means mounted in the housing exteriorly of the cold member and compressor cylinder to allow the compressor cylinder and piston to be matched in size with the regenerator-displacer for increased refrigerator efficiency, said off-axis drive mechanism interconnecting the regenerator-displacer of the cold member and the compressor piston to the motor, whereby the motor actuates the off-axis drive mechanism to sequentially reciprocate the regenerator-displacer and the compressor piston for circulating the cryogen throughout the working volume.

3,889,120

METHOD AND APPARATUS FOR DETERMINING FLOW CHARACTERISTICS IN A PIPELINE OR THE LIKE

John E. Greaney, 18610 Cape Charles Ln., Houston, Tex. 77058

Continuation-in-part of Ser. No. 149,957, June 4, 1971, Pat. No. 3,766,388. This application Jan. 26, 1973, Ser. No. 327,017

Int. Cl. G01t 1/00

U.S. Cl. 250—356 **13 Claims**

1. A system for measuring the flow characteristics of a material moving in a pipeline or the like, comprising

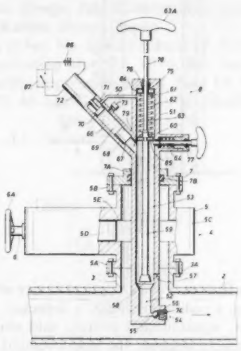
an elongate housing having a discharge port at one end for communication with the interior of said pipeline,

a tubular member positioned outside of said pipeline and having one end connected to said housing for communication with the interior of said housing,

a cylindrical member disposed in stoppering fashion in the end of said tubular member adjacent the interior of said housing,

a quantity of radioactive material disposed in said cylindrical member and composed of a mixture of a discrete quantity of an isotope having a relatively long half-life and decaying to form a daughter product having a relatively short half-life and a discrete quantity of a granulated non-radioactive material in ion exchange relationship with said isotope and not with said daughter product,

a quantity of a reagent material capable of permeating



said cylindrical member and dissolving daughter product accumulated therein and not capable of dissolving any significant amount of said granulated non-radioactive material,

means interconnected with said tubular member for urging a discrete portion of said reagent material through said cylindrical member into said housing,

ejection means for said dispensing said urged portion of reagent material from said housing into the interior of said pipeline, and

detection means externally spaced along said pipeline from said housing for sensing the presence of said discharged portion of reagent material and for deriving therefrom a functional indication of fluid flow in said pipeline.

3,889,121

APPARATUS FOR MEASURING THE WEIGHT PER UNIT AREA OF A MANUFACTURED SHEET PRODUCT CONSISTING OF A REINFORCING MATERIAL SURROUNDED BY A BULK MATERIAL

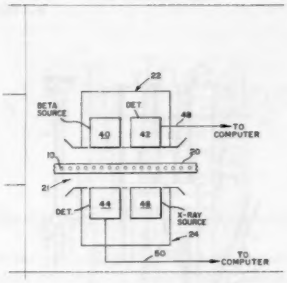
David A. Bossen, Woodside, Calif., assignor to Measurex Corporation, Cupertino, Calif.

Filed July 12, 1973, Ser. No. 378,430
Int. Cl. G01n *23/06*
U.S. Cl. 250—359 **9 Claims**

1. Apparatus for measuring the weight per unit area of various constituents of a tire fabric manufactured by calendering rubber onto both sides of a metal cord, comprising:

a first radiation source and radiation detector for generating a first electrical signal proportional to the radiation received at said first radiation detector, said first source being such that the rubber in said fabric absorbs a first fraction of said radiation and the metal cord in said fabric absorbs a second fraction, said second fraction being greater than said first fraction of said radiation whereby the radiation received at said first detector is primarily a measure of the metal weight per unit area of said tire fabric;

a second radiation source and detector for generating a second electrical signal proportional to the radiation received at said second detector, said second source being such that a first fraction of its radiation is absorbed



by said rubber and a second fraction of its radiation is absorbed or blocked by said metal cord whereby the radiation received at said second detector is primarily a measure of the rubber weight per unit area; and

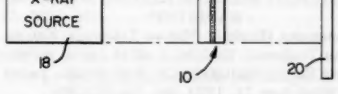
means for combining said first and second signals to form a third electrical signal proportional to the total weight per unit area of said tire fabric.

3,889,122

METHOD OF DETERMINING BOND QUALITY OF POWER TRANSISTORS ATTACHED TO SUBSTRATES

James C. Fletcher, Administrator of the National Aeronautics and Space Administration with respect to an invention of, and Thomas A. Telfer, Clinton, N.Y.

Filed Apr. 26, 1974, Ser. No. 464,721
Int. Cl. G01t *1/16*
U.S. Cl. 250—359 **6 Claims**



1. A method of determining the quality of the bond between a power transistor chip and a heat conductive, electrically insulating substrate between which is a thin layer of bonding material, the chip, substrate and material in combination constituting a unit, comprising:

a. selecting an index of bond quality for a production run unit in terms of the ratio that the area of bond voids in a minimally acceptable unit bears to the entire bond area;

b. X-raying the bond area of a production run unit to obtain an X-ray exposure transparency;

c. measuring the average optical density of the transparency; and

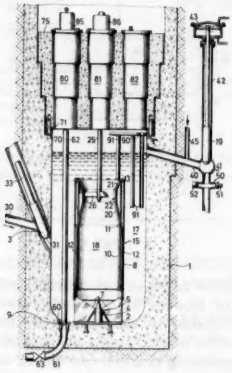
d. comparing the measured average optical density of the transparency with the index to determine the bond quality of the production run unit relative to a minimally acceptable unit.

3,889,123

IRRADIATION PLANT FOR FLOWABLE MATERIAL

Ernst Bosshard, Winterthur, Switzerland, assignor to Sulzer Brothers Ltd., Winterthur, Switzerland

Filed Feb. 15, 1973, Ser. No. 332,707
Claims priority, application Switzerland, Feb. 16, 1972, 2234/72
Int. Cl. G01n *21/26*
U.S. Cl. 250—437 18 Claims



1. An irradiation plant for the batch treatment of flowable material comprising

a vessel having a wall defining a surface of revolution about a vertical axis and enclosing an irradiation chamber;

a partition within said chamber defining a coaxial surface of revolution with said wall and dividing said irradiation chamber into two coaxial zones; and

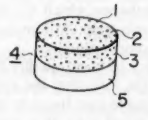
a circulating means in said irradiation chamber for circulating the flowable material successively through said two coaxial zones and in a sequence of opposite flow directions.

3,889,124

STANDARD LIGHT SOURCE UTILIZING SPONTANEOUS RADIATION

Osamu Yamamoto, Hirakata; Mutsuo Takenaga, Katano, and Yoshinobu Tsujimoto, Kashihara, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed June 21, 1973, Ser. No. 372,306
Claims priority, application Japan, June 26, 1972, 47-64363
Int. Cl. G21h *3/02*
U.S. Cl. 250—493 4 Claims



1. A standard light source utilizing spontaneous radiation which comprises a mixture of

a fluorescent substance $LnVO_4{:}X$ wherein Ln is selected from the group consisting of Y and Gd, and X is selected from the group consisting of Dy and Eu and,

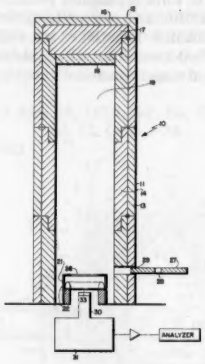
a radioactive substance containing a radioactive isotope.

3,889,125

RADIATION SHIELD FOR X-RAY FLUORESCENCE ANALYTICAL DEVICE

Arthur M. Gerber, Boston, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Feb. 21, 1973, Ser. No. 334,217
Int. Cl. G21f *1/00*
U.S. Cl. 250—515 8 Claims



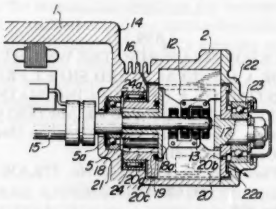
1. In an X-ray fluorescence analytical device which includes an X-ray source, a radiation shield, a detector, an amplifier and an analyzer, wherein said source, said shield and said detector are linearly aligned, the improvement which comprises providing as said shield a chamber having side walls and end cap of radiation adsorptive materials, said chamber of sufficient height above said source to substantially obviate back-scattered radiation onto said detector.

3,889,126

AIR PUMP

Shinya Ishihara, and Yoshihiro Suzuki, both of Anjo, Japan, assignors to Nippondenso Co., Ltd., Japan

Continuation-in-part of Ser. No. 299,450, Oct. 20, 1972. This application Sept. 26, 1973, Ser. No. 400,834
Claims priority, application Japan, Sept. 28, 1972, 47-113258
Int. Cl. F01n *3/10*
U.S. Cl. 290—1 1 Claim



1. An air pump constructed in a unit with a generator and adapted for use in an exhaust emission control system of an vehicle engine comprising a vane shaft integral with a shaft of a generator carrying gear teeth at a peripheral portion thereof, a pump rotor having an annular shaft, said annular shaft being provided with gear teeth formed at the inner surface thereof for speed reducing engagement with said gear teeth on the generator shaft, a flange integral with said gear teeth on the generator shaft and providing a surface facing a wall of said annular shaft, an annular groove formed in said wall or said

surface, a packing ring accommodated in said annular groove, a first bearing means for rotatably supporting said generator shaft, said first bearing means being provided at its end adjacent to the generator with a first sealing means for preventing lubricant from scattering, a second bearing means for supporting said rotor, said second bearing means being provided at its end adjacent to the air pump with a second sealing means for preventing lubricant from scattering, an air escaping passage formed through a wall of the rotor and through an end cover of the air pump so as to connect the interior of the rotor to the atmosphere.

3,889,127
ELECTRIC CONTROL SYSTEM FOR DRIVING AN ELECTRIC VEHICLE INCLUDING FIRST AND SECOND CONVERTERS

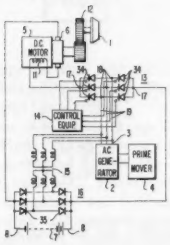
Fukuo Shibata, Hyogo, Japan, assignor to Kawasaki Jukogyo Kabushiki Kaisha, Hyogo, Japan

Continuation of Ser. No. 264,087, June 19, 1972, abandoned. This application Mar. 22, 1974, Ser. No. 453,892

Claims priority, application Japan, June 19, 1971, 46-4426; June 26, 1971, 46-46499; July 2, 1971, 46-48640

Int. Cl. H02p *5/28*

U.S. Cl. 290—14 **7 Claims**



1. An electric control system for driving an electric vehicle having at least one wheel, said system comprising:

a. alternating current electric generator means which has output terminals;

b. prime mover means for driving said electric generator means;

c. first electric motor means, having input terminals, for driving said wheel of the vehicle;

d. an electric battery which has output terminals connected electrically with the input terminals of said first electric motor means and with the output terminals of said electric generator means;

e. a first converter composed of controlled rectifiers and having A.C. side terminals connected electrically with the output terminals of said electric generator and D.C. side terminals connected electrically in series with the input terminal of said first electric motor and the output terminals of said electric battery;

f. control means connected to vary the turn on point of said controlled rectifiers to operate said first converter as a converter converting A.C. power into D.C. power or as an inverter converting D.C. power into A.C. power thereby controlling the electric generator voltage connected in said circuit with said first electric motor means; and

g. second converter having A.C. side terminals connected electrically with the output terminals of said electric generator and D.C. side terminals connected electrically with the output terminals of the said electric battery;

whereby said first electric motor means is variably supplied with electric power from said electric battery and said electric generator means permitting control of said first electric motor means over a wide speed range.

3,889,128
VARIABLE THRESHOLD ELECTRONIC RATE DETECTION SYSTEM FOR WHEEL SKID CONTROL

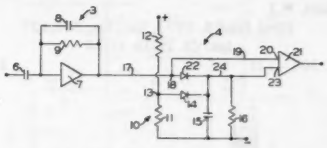
Dieter Luhdorff, Hannover, Germany, assignor to Westinghouse Bremsen-und Apparatebau GmbH, Hannover, Germany

Filed July 30, 1973, Ser. No. 383,824

Claims priority, application Germany, Sept. 6, 1972, 2243778

Int. Cl. B60t *8/12*

U.S. Cl. 307—9 **4 Claims**



1. An anti-skid brake control system for a vehicle comprising:

a. means for generating a speed signal proportional to the rotational velocity of a wheel of said vehicle;

b. differentiator means responsive to said speed signal for generating a deceleration signal; and

c. wheel skid detector means for providing a wheel skid control signal to modulate brake force at a wheel whose generated deceleration signal exceeds a deceleration threshold, and for automatically adjusting said deceleration threshold from a first chosen value to a different value corresponding to the maximum value attained by said deceleration signal when said deceleration signal exceeds said first chosen threshold value such that a subsequent decrease of said deceleration signal below said different threshold value terminates said wheel skid control signal at a point in time prior to the time said deceleration signal decreases below said first chosen threshold value.

3,889,129
DIRECT-CURRENT SUPPLY CONNECTOR

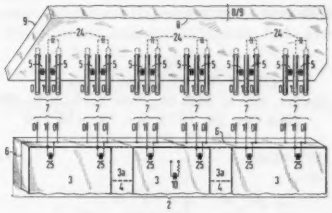
Willi Menzel, Gauting, and Gundolf Milde, Munich, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Sept. 20, 1973, Ser. No. 399,336

Claims priority, application Germany, Sept. 22, 1972, 2246602

Int. Cl. H02j *1/02*

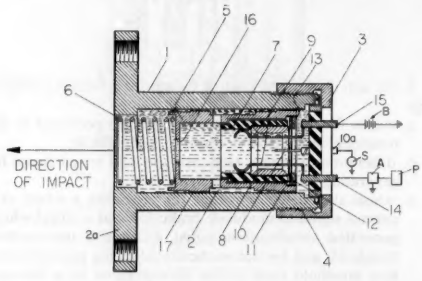
U.S. Cl. 307—105 **12 Claims**



1. A direct-current supply connector comprising a plurality of pairs of terminals for providing electrical connection between, on the one side of said connector an elongated flat module (2) provided with a low-inductance direct-current supply line and, on the other side of said connector a module rack for receiving a plurality of said elongated modules, said module rack being connected with each of said modules over one of said connectors, current being supplied from said direct

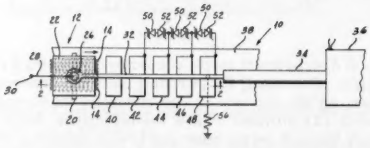
current supply line of said module rack to said module, wherein a first individual pair section of each of said terminal pairs which is connected to an outgoing line of said direct-current supply line is connected with a second pair section of said each terminal pair which is connected to a return line of the direct-current supply over a shunt capacitor disposed in the immediate vicinity of said each terminal pair.

3,889,130
MASS IN LIQUID VEHICULAR CRASH SENSOR
David S. Breed, Boonton, N.J., assignor to Breed Corporation, Fairfield, N.J.
Filed June 4, 1973, Ser. No. 366,427
Int. Cl. H01h *35/14*
U.S. Cl. 307—121 **16 Claims**



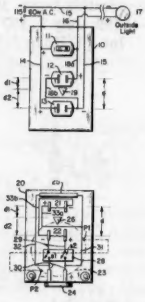
1. A crash sensor for sensing acceleration above a predetermined acceleration threshold of a vehicle having a normally inactive passenger restraint system and means for actuating said system, said sensor comprising a housing having a wall defining a chamber; a sensing mass occupying said chamber, the cross-sectional dimension of said chamber being greater than the corresponding dimension of said mass to provide an annular clearance between said mass and said wall and the longitudinal dimension of said chamber being greater than the corresponding dimension of said mass whereby said mass is enabled to move in a direction longitudinally of said chamber, said mass having a passage extending therethrough in the direction of longitudinal movement thereof; a liquid having kinematic viscosity lower than 100 centistokes at 70° F. and together with said mass substantially filling said chamber whereby the liquid may flow through said passage and said clearance operating means including means carried by said mass and responsive to predetermined movement of said mass in one direction to operate said actuating means; and biasing means acting on said mass and disabling said movement thereof in said one direction until said predetermined acceleration threshold is exceeded.

3,889,131
LONG LIFE RELIABLE RELAY
Jack B. Speller, 400 E. 56th St., New York, N.Y. 10022
Filed Oct. 29, 1973, Ser. No. 410,719
Int. Cl. H01h *9/30*
U.S. Cl. 307—136 **14 Claims**



1. A relay for applying a voltage to a load including a combination, a first contact, a plurality of spaced second contacts, means mounting said first contact and said second contacts for relative movement to cause said first contact successively to engage said second contacts, respective zener diodes connected between adjacent said second contacts, and means for applying said voltage and said load between said first contact and the last second contact engaged by the first contact, the breakdown voltages of said diodes being such as to ensure that the voltage change at the load is less than the breakdown potential between the first contact and the second contact engaged thereby as the first contact successively engages the second contacts.

3,889,132
TIMER ASSEMBLY FOR OUTSIDE LIGHT
Robert L. Vreeland, 2531 Neptune Pl., Calif. 93041
Filed Feb. 21, 1974, Ser. No. 444,420
Int. Cl. H01h *43/00*
U.S. Cl. 307—141 **7 Claims**



1. A timer assembly for an outside light comprising, in combination:

a. a wall plate including a toggle switch for turning said outside light on and off and first and second electrical outlets spaced a given distance from each other, said first and second electrical outlets normally connecting to positive and negative electrical power lines;

b. first interconnecting means in said wall plate removing the connection to the negative power line from one side of the first electrical outlet and connecting it to the side of the toggle switch connecting to the outside light, and second interconnecting means removing the other side of the first electrical outlet from the positive power line and connecting it to the negative power line so that said first electrical outlet is in parallel with the outside light;

c. a plug casing having first and second sets of plug blades extending therefrom and spaced from each other by said given distance, a timer in said casing having inlet and oulet leads, the inlet leads connecting to the second set of plug blades, and an electrical timer socket exposed on said casing connected to the outlet leads said timer including switch means for connecting the inlet leads to the outlet leads and time setting means connected to the switch means to close the switch means such that energy from said second set of plug blades is supplied to said timer socket during a predetermined time interval as set by said time setting means when said second set of plug blades is plugged into said second electrical outlet in said wall plate to energize the timer; and

d. third interconnecting means in said plug casing connecting to the positive side of the outlet leads of the timer connecting to the timer socket, and a fourth interconnecting means connecting the negative side of said first set of plug blades to the negative plug blade of the second set of plug blades; said first set of plug blades being received in said first electrical outlet in said wall plate and

said second set of plug blades being received in said second electrical outlet in said wall plate, whereby said outside light is automatically turned on for said predetermined time interval by said timer.

3,889,133
OUTPUT-VOLTAGE VARIABLE DEVICE

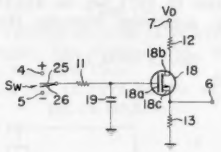
Shunzo Oka, and Shunji Minami, both of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Mar. 12, 1973, Ser. No. 340,347

Claims priority, application Japan, Mar. 16, 1972, 47-31952[U]; Mar. 16, 1972, 47-27189; Mar. 28, 1972, 47-31336; Mar. 28, 1972, 47-31337; Apr. 25, 1972, 47-49489[U]; Apr. 25, 1972, 47-41978

Int. Cl. H03k *17/00*

U.S. Cl. 307—239 **5 Claims**



1. An output-voltage variable device comprising

a. a metal oxide semiconductor field-effect transistor having a gate, a drain and a source,

b. an input resistor, a neon discharge lamp connected in series with the input resistor, a single-pole double-throw center-off switch having a movable contact arm connected through said input resistor and said neon discharge lamp to the gate of said field-effect transistor and having fixed positive and negative contacts connected to positive and negative DC sources, respectively, and connected to said movable contact arm by operative movement of said arm,

c. a non-polarized capacitor connected between said gate of said field-effect transistor and ground,

d. a drain resistor connected between the drain of said field-effect transistor and a positive DC supply,

e. an output resistor connected between the source of said field-effect transistor and ground,

f. an output terminal connected to said output resistor for deriving an output voltage whereby movement of said movable contact arm from the positive to the negative source and from the negative source to the positive source gradually charges and discharges said non-polarized capacitor, the output voltage thereby following the voltage on said non-polarized capacitor,

g. a casing for housing therein said MOS field-effect transistor, said input resistor, said switch, said capacitor, said drain resistor and said output resistor, said casing being provided with a positive input terminal electrically connected to said positive contact of said switch, a negative terminal electrically connected to said negative contact, a bias terminal electrically connected to said drain resistor, an output terminal electrically connected to said source of said field-effect transistor, and a ground terminal electrically connected to the grounding end of said capacitor and said output resistor, all of said terminals of said casing being used for external connections to said positive and negative DC sources, said bias DC supply, and ground,

h. an operating shaft drivingly connected to said movable contact arm, and

i. a variable resistor mechanically connected to said shaft, said variable resistor being adjusted simultaneously with the actuation of said single-pole double-throw center-off switch.

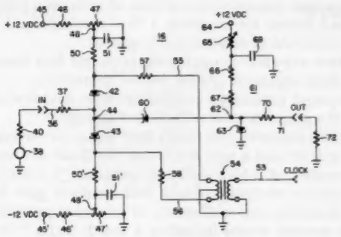
3,889,134
TUNNEL DIODE DIGITAL DATA SAMPLE, DECISION AND HOLD CIRCUIT

Jack K. Basham, Los Angeles, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed May 16, 1974, Ser. No. 470,691

Int. Cl. H03k *5/01, 19/10*

U.S. Cl. 307—268 **10 Claims**



1. A high speed sample, decision and hold circuit for sampling and reconstructing a nonreturn to zero digital data input, said circuit comprising:

a. a first and a second tunnel diode, the cathode of said first diode being directly connected to the anode of said second diode to form junction point;

b. means for applying the nonreturn to zero data to said junction point;

c. means coupled to said first and said second diode for biasing and balancing said diodes to form a Goto pair;

d. means for applying a clock signal of opposite polarity to said first and second diodes so that each diode is supplied with a clock signal of a predetermined polarity, whereby the data in conjunction with the clock signal will drive a selected one of said diodes into its injection region;

e. a memory circuit including a third tunnel diode;

f. means for biasing said third diode so that it is in a bistable condition; and

g. coupling means for coupling said first junction point to said third tunnel diode and for applying the voltage at said first junction point to said third diode to drive it from one stable state to the other or for maintaining it in its previous stable state depending upon the decision made by said first and second diodes.

3,889,135
BOOTSTRAP CIRCUIT EMPLOYING INSULATED GATE TRANSISTORS

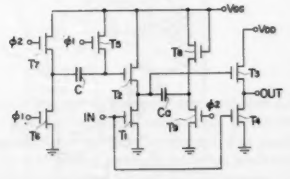
Kosei Nomiya; Yoshikazu Hatsukano, and Kazuo Minorikawa, all of Tokyo, Japan, assignors to Hitachi, Ltd., Japan

Filed June 28, 1973, Ser. No. 374,815

Claims priority, application Japan, July 21, 1972, 47-72528

Int. Cl. H03k *17/06, 17/10, 17/60*

U.S. Cl. 307—270 **3 Claims**



1. A bootstrap circuit employing insulated gate field effect transistors comprising:

a first insulated gate field effect transistor having a source, a drain, and a gate electrode;
first means for coupling the drain electrode of said first transistor to a first power source;
a second insulated gate field effect transistor having a source, a drain, and a gate electrode;
a first capacitor connected between the drain electrode of said second transistor and the gate electrode of said first transistor;
second means for coupling the source electrode of said second transistor to a source of reference potential;
third means for coupling a first clock pulse to the gate electrode of said second transistor;
a first impedance coupled between said first means and the drain electrode of said second transistor;
a second impedance coupled between said first means and the gate electrode of said first transistor;
a third insulated gate field effect transistor having a source, a drain and a gate electrode, the drain and source electrodes of which being respectively connected to the source electrode of said first insulated gate field effect transistor and said source of reference potential;
an inverter means including a fourth and a fifth insulated gate field effect transistor connected in series between a second power source and said source of reference potential, the gate electrode of said fourth insulated gate field effect transistor being connected to the source electrode of said first insulated gate field effect transistor, and the gate electrodes of said third and fifth insulated gate field effect transistors being connected together to an input signal terminal;
an output means for deriving an output from said inverter means connected to the source electrode of said fourth insulating gate field effect transistor; and
further including a sixth insulated gate field effect transistor having a source, a drain and a gate electrode, the source electrode of which is connected to said second means, a second capacitor connected between the source electrode of said first transistor and the drain electrode of said sixth transistor, a third impedance connected between said first means and the drain electrode of said sixth transistor, and fourth means for coupling a second clock pulse, shifted in time relative to said first clock pulse, to the gate electrode of said sixth transistor.

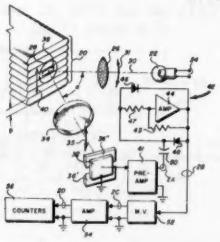
3,889,136
SIGNAL STRIPPING CIRCUIT

William L. Mohan, and Samuel P. Willits, both of Barrington, Ill., assignors to Spartanics, Ltd., Rolling Meadows, Ill.

Division of Ser. No. 301,661, Nov. 2, 1972, abandoned, which is a division of Ser. No. 120,889, March 4, 1971, Pat. No. 3,790,759, which is a division of Ser. No. 780,367, Dec. 2, 1968, Pat. No. 3,581,067. This application June 29, 1973, Ser. No. 375,105

Int. Cl. H03k *1/16*

U.S. Cl. 307—295 **7 Claims**



1. A circuit for stripping the highest frequency above a preset threshold level present in a signal wave train having more than one frequency component comprising
capacitive input coupling means, and
non-linear clamping circuit means comprising a diode clamped operational amplifier having a preset threshold level and connected at its input to said capacitive input coupling means to maintain the charge thereon in substantially matching relationship with said highest frequency above said preset level, the output of said non-linear circuit means being a square wave indicative of said highest frequency above said preset threshold level present in said signal wave train.

3,889,137
CIRCUIT ARRANGEMENTS COMPRISING A SWITCHING TRANSISTOR

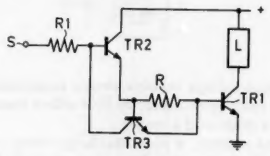
Malcolm John Kay, Lockleys, Australia, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 10, 1973, Ser. No. 423,275

Claims priority, application Australia, Dec. 20, 1974, 59174/73

Int. Cl. H03k *17/00*

U.S. Cl. 307—300 **7 Claims**



1. A switching circuit arrangement comprising:
a switching transistor;
means for supplying a switching signal for rendering said switching transistor conductive;
an amplifier for supplying said switching signal to said switching transistor, said amplifier having a current sensing impedence connected between the amplifier output and the base of the switching transistor; and
a feedback transistor for supplying a negative feedback signal to the input of the amplifier, said feedback transistor having its base-emitter junction connected across the current sensing impedance and having its collector supplying said feedback signal to the amplifier input, the base current being supplied to the switching transistor also operating to forward bias the base-emitter junction of the feedback transistor.

3,889,138
ELECTROSTATIC GENERATOR

William Douglas Allen, Quirang Burcot, near Abingdon, and Michael Morris, Frodsham, both of England, assignors to United Kingdom Atomic Energy Authority, London, England

Continuation of Ser. No. 297,838, Oct. 16, 1972, abandoned. This application Feb. 28, 1974, Ser. No. 446,954

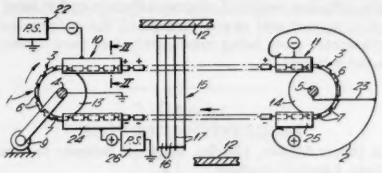
Claims priority, application United Kingdom, Oct. 28, 1971, 50287/71

Int. Cl. H02n *1/00*

U.S. Cl. 310—6 **4 Claims**

1. For electrically charging a high voltage terminal, the combination comprising a series of electrically conducting members of elongated form having smooth uncovered external surfaces, mechanical linkages interconnecting and electrically insulating adjacent members from one another thereby to arrange the members in substantially parallel side-by-side array in an endless chain, a charging station and discharging station of which at least the former comprises induction electrode means disposed on both sides of the elongated members,

the discharging station being arranged for the transfer of charge from the members to the high voltage terminal, and

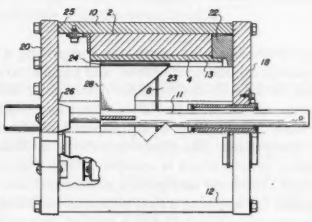


means for driving the endless chain along a path of travel from the charging station to the discharging station.

3,889,139
LINEAR MOTOR ACTUATOR

Gordon F. Hughes, Los Angeles, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Feb. 14, 1974, Ser. No. 442,727
Int. Cl. H02k *41/02*
U.S. Cl. 310—13 **9 Claims**

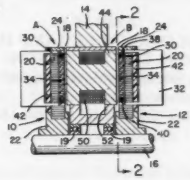


1. A linear magnetic actuator comprising:
an outer pole having substantially perpendicular and equal vertical and lateral exterior dimensions, and having a circular cylindrical bore centrally located about the longitudinal center line of said outer pole,
magnetic means for generating magnetic lines of force perpendicular to the top, side and bottom exterior surfaces of said outer pole,
a shaft slidably mounted along said center line of said outer pole and within said outer pole bore,
a hollow coil assembly of circular cylindrical shape rigidly attached to said shaft with said assembly longitudinal axis coincident with said outer pole center line and having a diameter smaller than the diameter of said bore,
drive current means for providing varying amounts of d.c. drive current,
winding means connected to said drive current means and wound around and rigidly attached to said coil assembly and having a radial thickness smaller than the radial dimension of the space between said outer pole and said coil assembly for producing a longitudinal driving force on said shaft when drive current from said drive current means is provided,
plate means for providing a low-reluctance circuit along the top, side, bottom, front and back external surfaces of said linear magnetic actuator, and
center pole means connected to said plate means for providing a low reluctance circuit through the interior of said coil assembly to the front and back external surface of said linear magnetic actuator.

3,889,140
INDUCTION BRAKE OR CLUTCH

Max Baermann, Cologne, Germany, assignor to Firma Max Baermann, Cologne, Germany

Continuation-in-part of Ser. No. 153,785, June 16, 1971, abandoned, which is a continuation of Ser. No. 853,764, Aug. 28, 1969, abandoned. This application June 8, 1973, Ser. No. 368,279
Claims priority, application Germany, Aug. 31, 1968, 1763894
Int. Cl. H02k *49/04*
U.S. Cl. 310—103 **18 Claims**

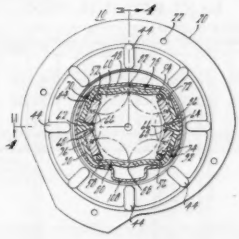


1. An electrical induction device comprising: a fixed first member, a second member mounted on a rotatable shaft for rotation relative to said first member in close spaced relationship thereto, said first member including a plurality of poles and said second member including means for causing an alternating flux field in said poles when said members rotate relative to each other, said second member means including a plurality of circumferentially spaced, wafer-shaped, permanent magnets each having a pair of pole surfaces, ferromagnetic pole shoes having inner and outer ends disposed intermediate said pole surfaces, said magnets being magnetized in the direction of their thin dimension with adjacent pole surfaces having the same polarity so that the outer ends of said pole shoes define a second member circumference comprised of magnetic poles of alternating polarity, and said inner ends of said pole shoes including means for securing said pole shoes to said shaft and said outer ends of said pole shoes having short-circuit windings thereon.

3,889,141
SIX POLE PERMANENT MAGNET MOTOR

Frank R. Merriam, Northville, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed May 24, 1973, Ser. No. 363,992
Int. Cl. H02k *21/26, 23/04*
U.S. Cl. 310—154 **16 Claims**



1. A permanent magnet dynamoelectric machine comprising a rotor and a stator rotatably supporting said rotor, four permanent magnets, and two ferro-magnetic flux path members mounted in said stator, each of said flux path members having end portions engaging two of said permanent magnets both of the permanent magnets in contact with one of said flux path members having a first commonly designated magnetic pole facing said armature and having their oppositely desig-

nated magnetic poles in engagement with said end portions of said one ferromagnetic flux path member, both of the permanent magnets in contact with the second flux path member having a first commonly designated magnetic pole in engagement with said end portions of said second flux path member and their oppositely designated magnetic poles facing said rotor whereby one of said flux path members is polarized as a magnetic north and the other of said flux path members is polarized as a magnetic south and the portions of the flux path member intermediate their ends form consequent poles to provide a six pole dynamoelectric machine using only four permanent magnets.

3,889,142

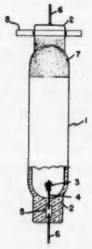
METAL HALIDE DISCHARGE LAMP HAVING HEAT REFLECTIVE COATING

William M. Keeffe, Rockport, Mass., assignor to GTE Sylvania Incorporated, Danvers, Mass.

Filed Mar. 25, 1974, Ser. No. 454,397

Int. Cl. H01j *1/02*

U.S. Cl. 313—44 **4 Claims**



1. An arc discharge lamp comprising an arc tube, made of high silica glass and having press seals at each end, containing a filling including inert starting gas, mercury and metal halide, having electrodes sealed therein at opposite ends and having a heat reflective coating of ZrO_2 and ZrB_2 on the ends of said arc tube.

3,889,143

PHOTOCATHODE MANUFACTURE

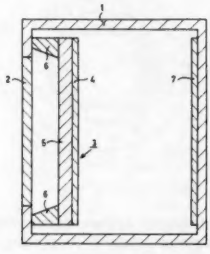
Jonathan Paul Gowers, Salfords, near Redhill, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 23, 1973, Ser. No. 418,295

Claims priority, application United Kingdom, Aug. 21, 1973, 54387/73

Int. Cl. H01j *39/16, 39/06*

U.S. Cl. 313—94 **6 Claims**



1. A photocathode structure containing a photocathode material, comprising:

a. a plate of single crystal gallium indium phosphide having major surfaces and relative proportions of gallium and indium such that the lattice parameter thereof is substantially the same as that of said photocathode material, and

b. an epitaxial layer of photocathode material located on a first said major surface of said crystal, the thickness of said layer of photocathode material being of the order of the diffusion length of electrons therein and at least part of a second said major surface of the gallium indium phosphide plate being substantially free from contact by solid material.

3,889,144

IMAGE INTENSIFIER TUBE

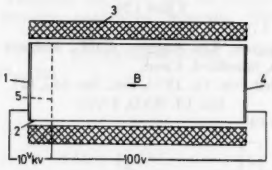
James Dwyer McGee, London, England, assignor to Electron Physics Limited, England

Filed Nov. 22, 1972, Ser. No. 308,725

Claims priority, application United Kingdom, Nov. 24, 1971, 054554/71

Int. Cl. H01j *39/10, 39/02*

U.S. Cl. 313—99 **5 Claims**



1. Image intensifier tube apparatus comprising a phoshpor screen, a photocathode spaced from and parallel to said phosphor screen, a fine wire electrode for producing a substantially equipotential surface in a plane substantially parallel to said phosphor screen, said plane being disposed intermediate said phosphor screen and said photocathode at a distance from said phosphor screen which is equal to or less than one-fourth of the distance between said photocathode and said phosphor screen, means for applying a first potential between said photocathode and said electrode and a second potential between said electrode and said phosphor screen, said first potential being relatively small with respect to said second potential and means for establishing a magnetic field transverse to said plane to focus photoelectrons emitted from said photocathode onto said phosphor screen, said disposition of said plane and said relation between said first and second potentials causing a major portion of magnetic focusing to occur in a region of relatively low electric field strength.

3,889,145

COLOR CATHODE RAY TUBE WITH PHOSPHOR STRIPS CONCAVE TOWARD VERTICAL CENTER LINE

Takeshi Suzuki; Hiroshi Tanaka, both of Fukaya; Takeo Ito, Honjo, and Hiroaki Komatsu, Fukaya, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawaski-shi, Japan

Filed Aug. 30, 1973, Ser. No. 393,028

Claims priority, application Japan, Aug. 30, 1972, 47-86354

Int. Cl. H01j *29/06, 29/08*

U.S. Cl. 313—408 **9 Claims**

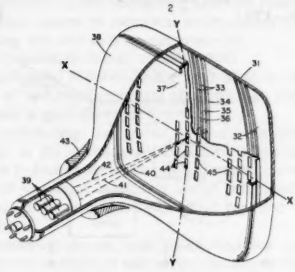
1. A color cathode ray tube comprising a curved screen panel having an inner surface with successive groups of three different elemental color vertical phosphor stripes arranged cyclically therein,

election gun means arrayed on a plane perpendicular to said phosphor stripes for generating three electron beams directed toward said screen for impinging on corresponding ones of said phosphor stripes,

a shadow mask interposed between said gun means and said inner panel surface and having substantially the same curvature as said panel, said mask having vertical rows of beam-passable apertures, said apertures being separated from one another along each row by narrow bridge por-

tions, each of said rows of apertures being associated with one of said groups of phosphor stripes and limiting the illumination thereof by said gun means,

said phosphor stripes and associated rows of apertures being substantially straight on and near the vertical axis of the tube as viewed in the direction of the central axis of the



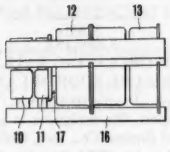
tube, and the remainder of said phosphor stripes and associated rows of apertures being outwardly curved in the horizontal axis direction on both sides of the Y-axis of the screen, the color stripes and associated rows of apertures becoming increasingly concave toward the axis of the screen with distance from it.

3,889,146

ELECTRON GUN ASSEMBLIES FOR USE IN COLOUR PICTURE TUBES

Kihachiro Koizumi, Chiba; Yukihiro Izumida, Mobara and Yoshihiko Miyata, Mobara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 6, 1974, Ser. No. 448,548
Claims priority, application Japan, Aug. 29, 1973, 48-96106
Int. Cl. H01j *29/50*
U.S. Cl. 313—414 **6 Claims**



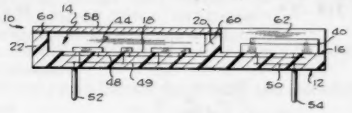
1. A delta type electron gun assembly for use in a colour picture tube comprising cathode electrodes arranged in a regular triangular configuration, first grid electrodes disposed in front of said cathode electrodes respectively, second grid electrodes disposed in front of said first grid electrodes respectively, a third hollow cylindrical grid electrode disposed to confront said second grid electrodes and extending substantially coaxially with said tube in the direction of travel of the electron beams emitted by said cathode electrodes, said third grid electrode being provided with three electron beam transmission perforations through one end wall far from said cathode electrodes thereof, said three perforations being also arranged in a regular triangular configuration, a fourth cylindrical grid electrode disposed in front of said third grid electrode, said fourth grid electrode being also provided with three electron beam transmission perforations arranged in a regular triangular configuration through a wall facing to said one end wall thereof, said third and fourth cylindrical grid electrodes comprising members for forming a main electron lens by applying different potential thereon, and means for supporting said cathode electrodes and said grid electrodes.

3,889,147

LIGHT EMITTING DIODE MODULE

Henry Tobin Groves, Van Nuys, Calif., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Filed Sept. 30, 1974, Ser. No. 510,495
Int. Cl. H05b
U.S. Cl. 313—500 **8 Claims**



1. A light emitting diode module having self-contained electronic circuitry, the module comprising:

a. module base having at least a first base compartment,

b. a plurality of electrical conductors formed within said base,

c. at least first and second electrical power conductor pins extending outwardly from said base and electrically connected to first and second ones of said electrical conductors respectively,

d. light emitting diode array positioned on said base and electrically connected between said second electrical conductor and a third one of said electrical conductors, said array positioned on said base so that adjacent arrays and arrays on adjacent modules are equidistant between array centers,

e. electronic circuitry positioned in said first base compartment and electrically connected between said first and third electrical conductors to drive and switch said array in a selected manner,

f. a cover for said first base compartment, and

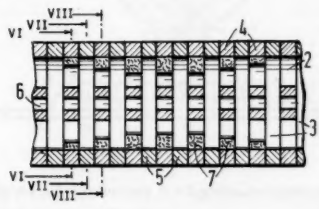
g. a transparent protective means covering said array.

3,889,148

TRANSIT TIME AMPLIFIER TUBE HAVING AN ATTENUATED DELAY LINE

Franz Gross, Schwanseestrasse 50, 8000 Munich 90, Germany

Filed Sept. 24, 1973, Ser. No. 399,963
Claims priority, application Germany, Oct. 23, 1972, 2251887
Int. Cl. H01j *25/34*
U.S. Cl. 315—3.5 **5 Claims**

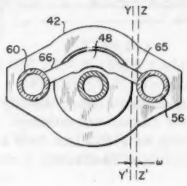


1. A transit time amplifier tube comprising a delay line including a hollow tube of circular inner cross section, said tube divided by successive transverse elements into cells, attenuating bodies in at least a few of said cells, said bodies consisting of material subject to losses and said bodies mounted in direct contact with the walls of said hollow tube, said attenuating bodies acting on a wide frequency band and having the form of segments of said circular inner cross section of said hollow tube and two of such bodies extending from opposite parts of said walls toward the longitudinal axis of the delay line by the same width.

3,889,149
LIQUID COOLED ATTENUATOR

Lester M. Winslow, Alexandria, Va., and Hazel E. Brown, Washington, D.C., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 24, 1973, Ser. No. 409,204
Int. Cl. H01j *25/34*
U.S. Cl. 315—3.5 10 Claims



1. In a traveling-wave tube having means for providing a stream of electrons along a predetermined path and means propagating electromagnetic energy comprising means defining a plurality of intercoupled interaction cavities in a manner so that interaction takes place with the stream of electrons further comprising:

a plurality of support pole pieces, each having at least one coupling hole means providing intercoupling of electromagnetic energy between said interaction cavities;

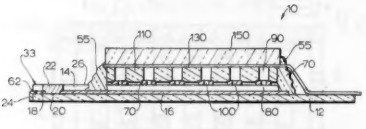
at least one lossy transmission line means disposed proximate and external to said predetermined path; and

means for preventing bondedge oscillation comprising a plurality of coupling irises located in said support pole pieces coupling directly at least one of said lossy transmission line means and at least one of said coupling means.

3,889,150
GASEOUS DISCHARGE DISPLAY PANEL WITH SCANNING ANODE BASE PLATE ASSEMBLY INCLUDING RESISTIVE MASSES

George John Przybylek, Martinsville, N.J., assignor to Burroughs Corporation, Detroit, Mich.

Filed July 30, 1974, Ser. No. 493,098
Int. Cl. H01j *17/34*
U.S. Cl. 315—58 7 Claims



1. A base plate assembly for a gas cell display panel comprising:

an insulator base plate having a plurality of slots formed therein with floors for receiving a plurality of scanning anodes;

a plurality of scanning anodes disposed on the floors of said slots with a discontinuity provided in each of said scanning anodes;

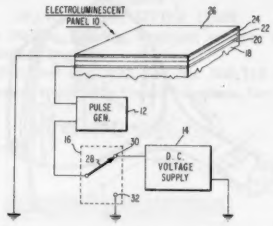
a resistive mass contained within each of said slots and bridging each of said discontinuities; and

a common bus provided across one end of said insulator base plate and coupled to said scanning anodes for providing a single terminal for coupling said scanning anodes with an external power supply.

3,889,151
ENERGIZING TECHNIQUE FOR ELECTROLUMINESCENT DEVICES

Joseph John Hanak, Trenton, and Peter David Southgate, Princeton, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Aug. 2, 1973, Ser. No. 384,882
Int. Cl. H05b *37/00*
U.S. Cl. 315—170 12 Claims



1. The combination comprising:

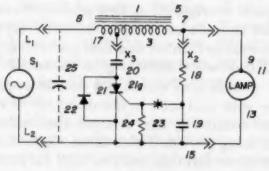
a. a given electroluminescent device having a non-linear current-voltage characteristic that a first voltage there across having a first level of a given polarity results in an insignificantly small current therethrough and an insignificant brightness of light emitted thereby and a second voltage thereacross having a second level of said given polarity which is higher than said first level results in a significantly large current therethrough and a significant brightness of light emitted therby, and

b. power supply means coupled across said device, including a DC voltage supply and a pulse generator connected in series with each other, said DC voltage supply supplying a continuous DC voltage magnitude of said first level and given polarity, and said pulse generator generating a series of intermittent DC pulses at a given duty cycle which is not in excess of one percent, with each pulse having said given polarity and an amplitude equal to the difference between said second level and said first level.

3,889,152
STARTING AND OPERATING BALLAST FOR HIGH PRESSURE SODIUM LAMPS

Richard Hill Bodine, Jr., Germantown, Tenn., and Marion Rosiak, Mt. Prospect, Ill., assignors to Litton Systems, Inc., Bellwood, Ill. and Bodine Co., Inc., Collierville, Tenn.

Filed Oct. 10, 1974, Ser. No. 513,711
Int. Cl. H05b *37/00*
U.S. Cl. 315—205 7 Claims



1. Means for starting and operating an arc discharge lamp comprising:

inductive ballast means, said ballast means containing a magnetic core and at least a first winding of N turns of insulated wire mounted on said core;

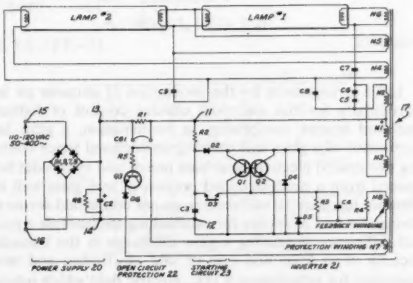
tap means on said winding at a position approximately N_T turns from said first end of said winding, wherein $N\text{-}N_T/N_T$ is a quantity greater than 1;

a circuit common;
means for connecting said lamp means in an electrical series circuit between an end of said winding and said circuit common;
means for monitoring the instantaneous voltage across said first winding, said means comprising:
first resistor;
first capacitor; means connecting said first resistor and first capacitor means in electrical series circuit between said winding end and said circuit common;
second capacitor means;
first and second semiconductor controlled rectifier means, each of said rectifier means containing an anode, a cathode and a gate electrode;
means connecting the anode of one controlled rectifier means to the cathode of the other controlled rectifier means to form a series circuit and means connecting said second capacitor means in series with said aforementioned series circuit between said tap and said circuit common;
diode rectifier means, said diode rectifier means being connected in shunt of said series circuit of said controlled rectifier means and in opposite polarity thereto;
second and third resistor means connected electrically in series across said diode rectifier means;
means placing the midpoint of said series resistor circuit electrically in common with a point in circuit between said series connected controlled rectifier means;
fourth resistor means connected between said gate electrode of said first controlled rectifier means and said cathode thereof;
fifth resistor means connected between the gate electrode of said second controlled rectifier means and said common lead;
third capacitor means connected between said gate electrode of said first controlled rectifier and said common lead; and
diac means connected between the gate electrode of said second controlled rectifier to said capacitor of said voltage monitoring circuit.

3,889,153
POWER SOURCE FOR FLUORESCENT LAMPS AND THE LIKE

John T. Pierce, Chemlsford, Mass., assignor to Iota Engineering Inc., Tucson, Ariz.

Filed Oct. 1, 1973, Ser. No. 402,317
Int. Cl. H02h *7/10;* **H05b** *41/29*
U.S. Cl. 315—209 R **5 Claims**

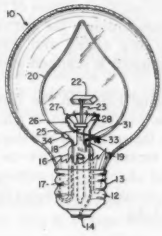


1. In a high frequency, high voltage power source for a load such as gas discharge lamps, the combination of:
an inverter comprising an oscillator circuit and transformer, said transformer having primary, secondary and feedback windings, said oscillator circuit including a transistor having emitter and collector electrodes connected in series with said primary winding across a pair of dc input terminals and having the base and one of said electrodes connected across said feedback winding;
an inverter starting circuit including a first resistor and first capacitor connected in series across said dc input terminals, and a breakdown device connected between the junction of said resistor and capacitor and said base, with said capacitor charging through said resistor and discharging through said breakdown device providing a starting current pulse to said transistor;
a protection winding on said transformer;
a second resistor connected in series at one of said dc input terminals;
a thermal circuit breaker for shunting said second resistor; and
heating circuit means connected across said protection winding and positioned adjacent said circuit breaker;
with said transformer providing an increased output at said protection winding when there is no load at said secondary winding for energizing said heating circuit means and actuating said circuit breaker to the open condition and developing a voltage drop across said second resistor reducing the current in said primary winding and transistor, and
with said heating circuit means including a third resistor for heating said circuit breaker and a second breakdown device permitting current flow through said third resistor from said protection winding when the protection winding voltage exceeds a predetermined amount.

3,889,154
VIBRATING FILAMENT LAMP WITH AUXILIARY STATIONARY FILAMENT

Wolfgang E. Thouret, Verona, N.J., and Rudolph Kaufman, Bronxville, N.Y., assignors to Duro-Test Corporation, North Bergen, N.J.

Filed Sept. 27, 1974, Ser. No. 509,831
Int. Cl. H01k *7/06, 9/00*
U.S. Cl. 315—267 **10 Claims**

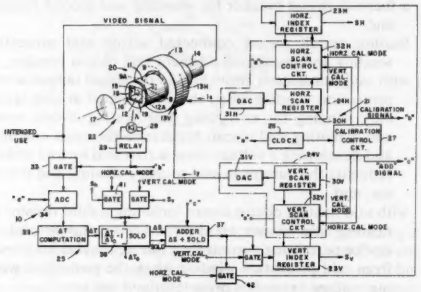


1. An incandescent lamp for operation from a source of alternating current comprising:
a transparent envelope,
means for producing a magnetic field,
a first filament, means for supplying the alternating current to said first filament to cause said first filament to incandesce, means for mounting said first filament at a predetermined orientation with respect to said magnetic field to produce an interaction between said magnetic field and the current flowing through said first filament to cause said first filament to vibrate,
and second means having electrical resistance properties electrically connected to said first filament to produce a voltage drop across said second means.

3,889,155
APPARATUS FOR CALIBRATING AN IMAGE DISSECTOR TUBE

Edwin E. Klingman, III, Huntsville, Ala., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Mar. 5, 1974, Ser. No. 448,325
Int. Cl. H01j *31/26*
U.S. Cl. 315—369 **10 Claims**



1. Apparatus for automatically calibrating a TV camera tube having a photosensitive screen on which an electron image of the scene being televised is formed, and a system for developing a video signal from a beam of electrons originating from the screen at a selected elemental area whose position depends on the level of current flowing through deflection coils associated with the tube, the apparatus comprising:

a. means generating a calibration signal;

b. light source means responsive to the calibration signal for illuminating the screen with a light pattern having parallel opposite edges;

c. a settable slope control circuit;

d. a current generator responsive to the calibration signal for supplying to the deflection coils a sweep signal that sequentially moves the location of the selected elemental area along a line crossing the pattern in a direction perpendicular to the edges and extending therebeyond whereby the pattern is scanned and the tube produces a video pulse;

e. the sweep signal being in the form of a time-variable current whose average rate of change is constant and dependent on the setting of the slope control circuit; and

f. automatic means responsive to the duration of the video pulse for changing the setting of the slope control circuit if such duration is different from a standard associated with the tube.

3,889,156
DOUBLE TUNED RETRACE DRIVEN HORIZONTAL DEFLECTION CIRCUIT

Manohar L. Arya, Hoffman Estates, Ill., assignor to Warwick Electronics Inc., Chicago, Ill.

Filed Sept. 21, 1973, Ser. No. 399,988
Int. Cl. H01j *29/70*
U.S. Cl. 315—408 **10 Claims**

1. A scanning circuit for producing in a deflection winding a generally sawtooth deflection current having a trace period and a retrace period, comprising:

a voltage source;

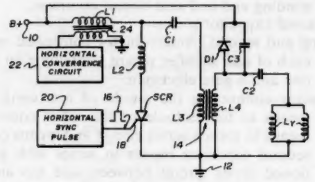
a reactive impedance for storing energy;

coupling means for supplying current to said deflection winding;

a charge circuit for charging the reactive impedance from said voltage source during the trace period;

a semiconductor device having a first state, and a second state occurring in response to a predetermined electrical flow;

a discharge circuit energized by said semiconductor device during the retrace period for discharging the reactive impedance through said coupling means to produce in said deflection winding a generally sawtooth current, said

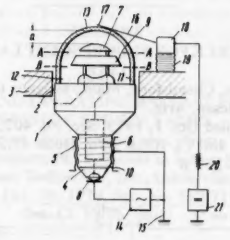


discharge circuit being resonant at a first frequency related to the retrace period for generating a fundamental current flow through said semiconductor device and resonant at a second frequency higher than the first frequency for generating at the end of a said retrace period a secondary current flow which switches said device to said first state.

3,889,157
ARRANGEMENT FOR THE GENERATION OF UNIPOLAR AIR IONS

Constantin Graf Von Berckheim, Friedrichstrasse 9, Weinheim, Germany

Filed Nov. 29, 1973, Ser. No. 420,171
Claims priority, application Germany, Dec. 11, 1972, 2260521
Int. Cl. H01t *19/00*
U.S. Cl. 317—4 **14 Claims**

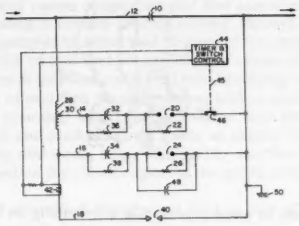


1. An arrangement for the production of unipolar air ions, particularly for the electrical climate control of habitable enclosed spaces, comprising, in combination, a glow lamp comprised of a glass wall defining an enclosed space containing two spaced electrodes, at least one of said electrodes being spaced from a predetermined portion of said glass wall by a distance less than 10 millimeters; means connected across said electrodes and operative for establishing thereacross a potential difference producing a glow discharge in the immediate vicinity of at least said one of said electrodes; and means operative for establishing a D.C. electric field which interacts with the ultraviolet radiation emitted in said glow discharge to produce said unipolar air ions, and including an electrical conductor having a tip portion located outside the enclosed space defined by said glass wall but in the immediate vicinity of said predetermined portion of said glass wall, so as to be located close to said glow discharge, and means for maintaining said tip of said electrical conductor at a high D.C. potential.

3,889,158
SERIES CAPACITOR PROTECTION EQUIPMENT WITH DUAL SPARKOVER FEATURE

Charles A. Peterson, Bloomington, Ind., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 27, 1974, Ser. No. 500,996
Int. Cl. H02h 7/16
U.S. Cl. 317—12 A 6 Claims



1. Protective apparatus for electrical equipment comprising: first, second, and third circuit branches connected electrically in parallel across the equipment to be protected;

said first circuit branch including means for bypassing the equipment at a first predetermined over-voltage level;

said second circuit branch including means for bypassing the equipment at a second predetermined over-voltage level higher than said first predetermined over-voltage level;

said third circuit branch including means for bypassing the equipment at a third overvoltage level higher than said second overvoltage level;

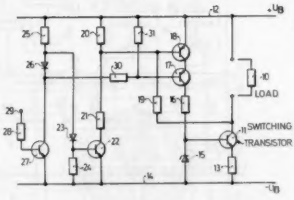
voltage cascading means for causing said second and third circuit branches to have their bypassing means operate upon the occurrence of an overvoltage effective to cause operation of the bypass of said first circuit branch;

means for disabling said first circuit branch upon the occurrence of the bypass through the third circuit branch and for restoring said first circuit branch to its original operating condition at a predetermined time after it is disabled.

3,889,159
METHOD AND SYSTEM TO PROTECT ELECTRONIC SWITCHING COMPONENTS

Wolf Wessel, Schwieberdingen, Germany, assignor to Robert Bosch G.m.b.H., Gerlingen-Schillerhoehe, Germany

Filed Jan. 16, 1974, Ser. No. 433,732
Claims priority, application Germany, Mar. 2, 1973, 2310448
Int. Cl. H02h 3/20
U.S. Cl. 317—31 21 Claims



1. Method of protecting an electronic semiconductor switching element (11) against short circuits in a load (10) connected in series therewith, comprising

generating a test pulse upon connection of the load (10);

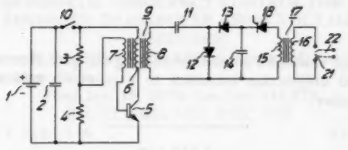
connecting said test pulse to the switching element (11) to render said switching element conductive;

testing the voltage at the junction of the switching element (11) and the load (10) and blocking the switching element (11), or permitting the switching element to remain conductive, in dependence on the level of the sensed test pulse.

3,889,160
SPARK-PRODUCING ARRANGEMENT FOR A LIGHTER WITH A BATTERY

Claus Christian Cobarg, Steinbach, Germany, assignor to Braun Aktiengesellschaft, Kronberg, Taunus, Germany

Filed Sept. 6, 1973, Ser. No. 394,749
Claims priority, application Germany, Sept. 6, 1972, 2243695
Int. Cl. F23q 3/00
U.S. Cl. 317—96 1 Claim



1. A spark-producing circuit comprising a source of D.C. voltage, an oscillating means including spark means coupled to said course of D.C. voltage, a sensing means placed adjacent said flame and sensing the presence of the flame for turning off said oscillating means when a flame is present, said oscillating means comprises a voltage transducer means having a primary, a secondary and a feedback winding, a transistor device having a base electrode connected to said feedback winding, a primary winding connected to said collector electrode, a voltage dividing circuit including said sensor means connected through said feedback winding to the base electrode of said transistor device, an operating switch means connecting said voltage divider circuit to one terminal of said D.C. voltage source, a discharge circuit connected to said secondary winding and including a storage capacitor means and a thyristor device connected in a series therewith and capable of producing a high voltage pulse when the charge in said storage capacitor attains a predetermined breakdown voltage of said thyristor means, a high voltage step-up transformer means having a primary winding connected in series with said storage capacitor means and said thyristor means and a secondary winding, a spark gap means connected in series with said secondary winding of said step-up transformer means, whereby a spark is produced in said spark gap means when said storage capacitor discharges over said thyristor device.

3,889,161
ELECTRONIC CONTROL SYSTEM

Steven F. Trush, P.O. Box K (Cross Ave.), Morrisville, N.Y. 13408

Filed Nov. 16, 1973, Ser. No. 416,570
Int. Cl. H01h 47/32
U.S. Cl. 317—148.5 B 8 Claims

1. An electronic control system including:

a rectifying input circuit to be connected to an alternating current voltage source and having a positive lead and a negative lead across which a unidirectional operating potential is established;

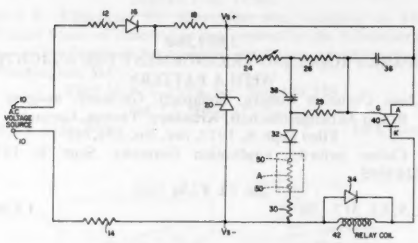
a programable unijunction transistor having anode and cathode electrodes and having a gate electrode;

a controllable electric device connected in series with the anode and cathode electrodes of said unijunction transistor across the positive and negative leads of said rectifying input circuit;

resistance means;

a resistance-sensitive sensing element connected with said resistance means as a voltage divider across the positive

and negative leads of said rectifying input circuit; and



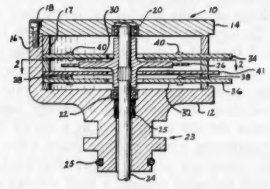
further resistance means connecting the gate electrode of said unijunction transistor to a point on said voltage divider.

3,889,162

SOLENOID DRIVING MEANS

John L. Myers, Dayton, Ohio, assignor to Ledex, Inc., Dayton, Ohio

Filed Feb. 4, 1974, Ser. No. 439,380
Int. Cl. H01h *47/32*
U.S. Cl. 317—148.5 R **9 Claims**



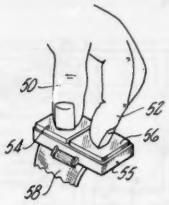
1. A solenoid driving circuit comprising, in combination,
first operational amplifier means having an inverting input, a non-inverting input, an output, and feedback means connecting the output and the non-inverting input;
input signal means connected to the non-inverting input of said first operational amplifier means and capable of applying an input signal thereto;
means for connecting a source of threshold potential to the inverting input of said first operational amplifier means;
second operational amplifier means having an inverting input, a non-inverting input, an output, and feedback means connecting the output and the non-inverting input;
means for connecting a source of threshold potential to the non-inverting input of said second operational amplifier means;
signal transmitting means for applying a signal from the output of said first operational amplifier means to the inverting input of said second operational amplifier means, and including signal duration limiting means;
high-voltage driver means connected to the output of said second operational amplifier means and responsive to a signal on said output to produce a high-voltage solenoid-energizing pulse; and
low-voltage driver means connected to the output of said first operational amplifier means and responsive to a signal on said output to produce a low-voltage solenoid holding pulse following termination of the high voltage solenoid-energizing pulse.

3,889,163

MEANS TO ASSIST A PERSON IN OVERCOMING HABITS

Eliot Norman Symmes, Seattle, Wash., assignor to Habi-chek Corporation, Campbell, Calif.

Filed Jan. 14, 1974, Ser. No. 433,344
Int. Cl. A61n *1/38*
U.S. Cl. 317—262 S **1 Claim**



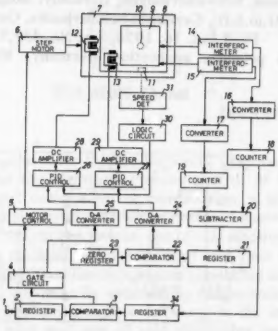
1. Means to assist a person in overcoming an undesirable habit comprising a wrist band adapted to be worn on the wrist of said person, a housing secured to said wrist band, a source of power capable of inducing an electric shock, an electrical circuit within said housing connected to said source of power and including a pair of open terminals to maintain said electrical circuit normally non conducting, a pair of relatively spaced electrodes connected to said terminals, said electrodes being disposed sufficiently close to each other to be physically engaged by two fingers of the hand of said person to close said electrical circuit causing current to flow to induce an electric shock in said person whereby a person may consciously self induce an electric shock to assist himself in building up an aversion to said undesirable habit.

3,889,164

POSITION CONTROL SYSTEM USING MAGNETIC FORCES FOR CORRECTING THE INCLINATION OF A CONTROLLED MEMBER INCLUDING A TORSIONAL MOUNTING

Junichi Nishizawa, Sendai, and Wasaburo Ichinose, Tachikawa, both of Japan, assignors to Handotai Kenkyu Shinkokai, Japan and Kokusai Denki Kabushiki Kaisha, Japan

Filed Jan. 24, 1973, Ser. No. 326,187
Int. Cl. G05b *1/06*
U.S. Cl. 318—640 **4 Claims**



1. A position control system using magnetic forces for correcting the position and inclination of a controlled member relative to a reference position comprising:
a first controlled member, at least a part of which is composed of a magnetic substance;
a first electromagnet having at least one pole opposed to the magnetic substance of said first controlled member with a first air gap therebetween, the magnetic substance, the

first air gap and the electromaget defining a electromagnet magnetic circuit;

presetting means for presetting the width of the first air gap to a width greater than a predetermined width;

first supporting means including at least one spring for moveably supporting said first controlled member so as to be moveable along a line of action of a first magnetic force developed between the first electromagnet and the magnetic substance;

first control means coupled to said first electromagnet for controlling a control current flowing through said first electromagnet to adjust said magnetic force and to adjust the width of said first air gap so as to obtain the desired position of said first controlled member along said line of action of said first magnetic force, said magnetic circuit being saturated at a condition where said first air gap reaches said predetermined width, an elastic force developed by said spring being balanced by said first magnetic force within the elastic region of the spring at said conditon;

a second controlled member, at least a part of which is composed of a magnetic substance;

second supporting means comprising a torsion spring for rotatably supporting said second controlled member on said first controlled member;

a correcting electromagnet having at least one pole opposed to the magnetic substance of said second controlled member at a point along a line of action of a force developed by said correcting electromagnet remote from said second supporting means and a second air gap between said correcting electromagnet and said second supporting means, the magnetic substance of said second supporting means, the second air gap and the correcting electromagnet defining a second magnetic circuit;

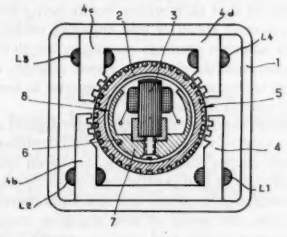
detection means comprising a pair of interferrometers for detecting the inclination of said second controlled member relative to its position prior to the application of said first magnetic force to said first controlled member by use of two light beams; and

correcting control means coupled to said correcting electromagnet and said detection means for controlling a second control current flowing through said correcting electromagnet so as to rotate said second controlled member to eliminate said inclination of said second controlled member.

3,889,165
LINEAR AND ROTARY ACTUATOR

Trong Nguyen Van, La-Celle-Saint-Cloud, France, assignor to La Telemecanique Electrique, Nanterre, France

Continuation-in-part of Ser. No. 292,427, Sept. 21, 1972, abandoned. This application Jan. 31, 1974, Ser. No. 438,474
Claims priority, application France, Sept. 28, 1971, 71.34793
Int. Cl. H02k *41/00*
U.S. Cl. 318—115 **5 Claims**

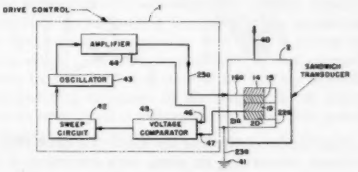


1. Actuator device having a movable component adapted for moving in rotation about an axis and in translation along said axis, said movable component being made of a magnetic material and having on a first portion of its surface a first series of elongated channels substantially perpendicular to the said axis and, on a second portion of its surface, a second series of elongated channels substantially parallel to the said axis, first and second sets of magnetic pole pieces respectively equipped with first and second sets of coils and comprising teeth whose pitch corresponds to that of the channels being arranged opposite said respective first and second surface portions and supply means for separately energizing said first and second sets of coils, said supply means being adapted for sequentially energizing the coils of each set and for simultaneously energizing the coils of each set.

3,889,166
AUTOMATIC FREQUENCY CONTROL FOR A SANDWICH TRANSDUCER USING VOLTAGE FEEDBACK

Lawrence D. Scurlock, Elyria, Ohio, assignor to Quintron, Inc., Columbus, Ohio

Filed Jan. 15, 1974, Ser. No. 433,575
Int. Cl. H02n *3/00, 5/00, 7/00*
U.S. Cl. 318—116 **11 Claims**



1. An automatic drive circuit for driving a mechanical displacement device or the like at resonance, comprising in combination:

a. variable frequency oscillator means for generating an AC signal at a frequency determined by an input signal thereto and in a range including the resonant frequency of such device;

b. amplifier means responsive to such AC signal for producing a drive signal for said mechanical displacement device to effect displacement in the same;

c. feedback means mounted to said device and responsive to such displacement for producing a feedback voltage proportionally representative of said displacement;

comparator means for comparing the voltage of such drive signal and such feedback voltage, said comparator means producing a first sweep control output signal when said drive signal voltage exceeds such feedback voltage, and producing a second sweep control output signal when said feedback signal exceeds said drive signal;

e. sweep circuit means having an input connected to the output of said comparator means and responsive to such sweep control output signal for generating a sweep signal as a periodcially varying voltage signal in response to said first sweep control output signal, when such drive signal voltage exceeds such feedback voltage, and for generating a fixed voltage output signal, when such feedback voltage equals or exceeds such drive signal voltage, said sweep circuit means having an output coupled to said variable frequency oscillator means to provide such sweep signal as such input signal to said variable frequency oscillator;

whereby said voltage comparator means locks said sweep circuit means to produce a fixed voltage output signal at a magnitude to effect operation of said variable frequency oscillator means and amplifier means at a fixed frequency to provide a drive signal to the mechanical displacement device for driving the same at resonance when such feedback voltage equals or exceeds such drive signal voltage and whereby said voltage comparator unlocks said sweep

circuit means to produce said periodically varying voltage signal to drive said variable frequency oscillator as a sweep frequency oscillator when said drive signal voltage exceeds said feedback voltage.

3,889,167

DEVICE FOR CONTROLLING SPEED OF THREE-PHASE INDUCTION MOTOR

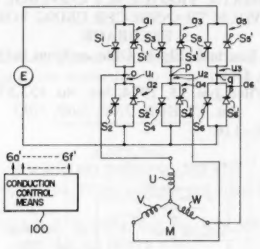
Tsuyoshi Tanaka, Chiba, and Hisakazu Ninomiya, Narashino, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Nov. 26, 1973, Ser. No. 418,808

Claims priority, application Japan, Nov. 29, 1972, 47-119019; Jan. 24, 1973, 48-9532; Apr. 4, 1973, 48-37807

Int. Cl. H02p *5/40*

U.S. Cl. 318—227 **2 Claims**



1. A device for controlling the speed of a three-phase induction motor, comprising six arms, each consisting of two thyristors arranged in inverse parallel connection, wherein three units are formed, each consisting of two arms connected in series with each other; said units are connected in parallel with each other between two of the three phases of a three-phase a.c. power source; and the junction points of said arms connected in series are connected with the primary winding of said motor.

3,889,168

ON-OFF CONTROL CIRCUIT

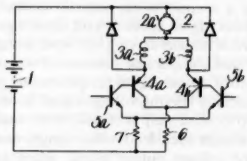
Kazutoshi Onishi; Tsuneo Awano, both of Yokohama, and Isao Masuzawa, Kuki, all of Japan, assignors to Kabushikikaisha Tokyo Keiki, Tokyo, Japan

Filed May 23, 1973, Ser. No. 363,172

Claims priority, application Japan, May 25, 1972, 47-52064

Int. Cl. H02p *5/16*

U.S. Cl. 318—341 **6 Claims**



1. An ON-OFF control circuit for a load requiring large DC electrical power comprising: a DC electrical power source, first and second transistors, first and second resistors, a first current path composed of said first transistor and said first resistor, and a second current path composed of said second transistor and said second resistor, the first current path being connected at its one end to one terminal of the DC electrical power source through said load and at its other terminal to the other terminal of the DC electrical power source, the second current path being connected at its one end to the base electrode of the first transistor and its other end to the other terminal of the DC electrical power source and the base electrode of said second transistor being supplied with an ON-OFF control input signal and said first and second current paths passing through said load.

3,889,169

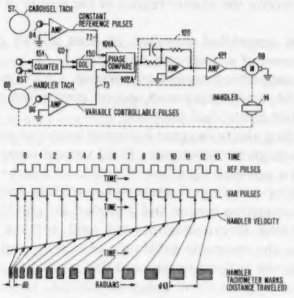
POSITION AND VELOCITY SERVO CONTROL FOR MOTOR CONTROLLED ARTICLE CARRIER AND HANDLER

Joel A. Hirschman, San Jose, Calif., and Howard E. Van Winkle, Boulder, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 11, 1973, Ser. No. 405,611

Int. Cl. G05b *13/00*

U.S. Cl. 318—571 **9 Claims**



1. For an article storage and retrieval apparatus for handling a plurality of articles having a predetermined shape and one given dimension,

a continuously moving article carrier having a plurality of article retaining means disposed about its outer periphery and traveling along a given travel path at a given speed;

a transfer station adjacent said outer periphery and interposable into said travel path and including intermittently moved article engaging means for selectively transferring articles to and from an article storing location without stopping or altering the speed of said article carrier and including speed control means for matching speed of said article engaging means to that of the article retaining means during said selective article transfer;

an improved control apparatus, including in combination:

a tachometer element in said transfer station and mounted for movement with said article engaging means, said tachometer element having tachometer marks spaced in accordance with a predetermined velocity profile for said engaging means, spacing between predetermined adjacent ones of said tachometer marks being inversely related to desired speed of said engaging means with successively adjacent spacings varying in length for indicating acceleration/deceleration speed change, means for supplying tachometer signals in response to movement of said tachometer element; and

control means receiving said tachometer signals and having means operatively associated with said continuously moving article carrier for measuring said given speed, motor control means in said central means jointly responsive to said measured given speed and said tachometer signals to synchronize the speed of said engaging means to said article carrier during said selective article exchange and to accelerate and decelerate said engaging means to and from said given speed in accordance with said velocity profile indicated on said tachometer element by said variably spaced marks.

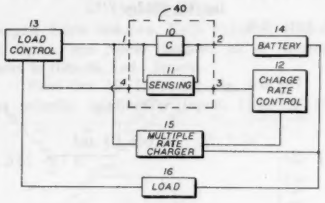
3,889,170
BATTERY CHARGE RATE CONTROL

Robert I. Sarbacher, and Robert E. Mauch, both of Santa Monica, Calif., assignors to John C. Bogue, Santa Monica, Calif.

Continuation of Ser. No. 289,534, Sept. 15, 1972, abandoned. This application Aug. 1, 1973, Ser. No. 384,418.

Int. Cl. H02j *7/04*

U.S. Cl. 320—14 **12 Claims**



1. Apparatus for charging a battery comprising:
a battery having first and second terminals;
a load circuit having first and second terminals;
a load control circuit for automatically uncoupling and coupling said battery from said load circuit, said load control circuit having first, second and third terminals;
a coulometer having first and second terminals; means to couple said first terminal of said battery to said first terminal of said load circuit;
means to couple said second terminal of said load circuit to said first terminal of said load control circuit;
means to couple said second terminal of said battery to said second terminal of said coulometer;
means to couple said first terminal of said coulometer to said second terminal of said load control circuit;
a multiple rate charger having a first terminal coupled to said first terminal of said load circuit and said first terminal of said battery, a second terminal coupled to said first terminal of said coulometer and said second terminal of said load control circuit and a third terminal;
a charge rate control circuit having a first terminal coupled to said third terminal of said multiple rate charger and a second terminal; and
a sensing circuit including a first transistor having an emitter electrode coupled to second terminal of said coulometer and said second terminal of said battery, a base electrode coupled to said first terminal of said coulometer and said second terminal of said load control circuit and a collector electrode coupled to said second terminal of said charge rate control circuit, and a second transistor having an emitter electrode coupled to said base electrode of said first transistor, a base electrode coupled to said emitter electrode of said first transistor and a collector electrode coupled to said third terminal of said load control circuit.

3,889,171
BATTERY CHARGER

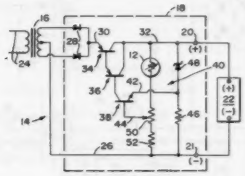
Thomas C. Hunter, Jr., Winchester, Mass., assignor to Standby Systems, Inc., Medford, Mass.

Continuation of Ser. No. 258,815, June 1, 1972, abandoned, which is a continuation of Ser. No. 60,255, Aug. 3, 1970, abandoned. This application Oct. 12, 1973, Ser. No. 405,844

Int. Cl. H02j *7/04, 7/16*

U.S. Cl. 320—31 **11 Claims**

1. A battery charging circuit having, in combination,
a direct current source,
terminals for a battery having a predetermined float potential to be charged,
a circuit connecting said source and terminals including a first variable impedance connected in series therewith,
and control means including a thermally variable impedance varying as a continuous function of temperature and heat retaining and conducting means in position to transfer heat produced by current flowing in said first variable impedance to said thermally variable impedance, said control means being continuously responsive to increases



in the temperature of said thermally variable impedance to produce corresponding decreases in the magnitude of said first variable impedance, said control means being continuously responsive to decreases in said current resulting from the charged state of the battery to produce corresponding increases in the magnitude of said first variable impedance continuously until said float potential is reached at said terminals.

3,889,172
METHOD AND APPARATUS FOR LIMITING CHARGE OF A STORAGE BATTERY CHARGED AT A CONSTANT VOLTAGE

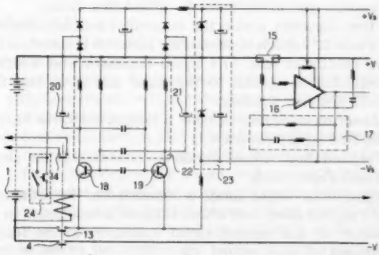
Daniel Lelaidier, Clamart, and Jean Quobex, Paris, both of France, assignors to Saft-Societe des Accumulateurs Fixes et de Traction, Romainville, France

Filed Oct. 11, 1973, Ser. No. 405,636

Claims priority, application France, Oct. 13, 1972, 72.36372

Int. Cl. H02j *7/00;* **H02h** *3/08*

U.S. Cl. 320—39 **34 Claims**

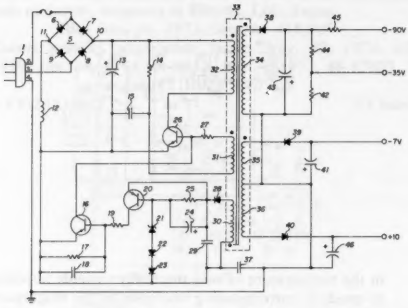


1. Method for limiting the charge of a storage battery comprising charging the battery at a constant voltage, measuring the derivative of the current with respect to time and limiting charge of the battery in response to said derivative upon said derivative reaching a predetermined positive value.

3,889,173
SWITCHING REGULATOR POWER SUPPLY

Donald L. Klusmann, Plano; Jin Y. Soh, Dallas, and Roger B. Whitaker, Garland, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 7, 1973, Ser. No. 422,626
Int. Cl. H02m *7/20*
U.S. Cl. 321—2 **3 Claims**



1. A regulated power supply circuit of varied input and constant output capability which comprises:

a. a full-wave rectifier to produce DC output voltages from input voltages of varied magnitude and frequency;

b. a blocking oscillator containing an oscillating transistor connected to said rectifier;

c. a toroidal transformer connected to said oscillator to store output energy from said oscillator;

d. a rectifier and a capacitor connected to a secondary winding of said transformer to charge said capacitor in dependence upon the turns of secondary winding and the repetition rate of said oscillator to provide an output voltage across said capacitor;

e. feedback means including first and second signal transistors coupled to a winding of said transformer for turning said oscillator on and off to maintain said output voltage at a predetermined level;

said feedback means further includes:

f. a first diode whose anode is connected in series to the top terminal of said winding and whose cathode is connected to the emitter of said first signal transistor;

g. a first resistor connected to the base of said first signal transistor and to the cathode of said first diode;

h. a first capacitor connected in parallel with said resistor;

i. a second capacitor whose first terminal is connected to the emitter of said first signal transistor and which is connected in parallel to the serial circuit of said first diode and said winding;

j. a Zener diode whose cathode is connected to the base of said first signal transistor;

k. a second diode whose anode is connected to the anode of said Zener diode;

l. a third diode whose anode is connected to the cathode of said second diode and whose cathode is connected to the emitter of said second signal transistor, to the second terminal of said second capacitor, and to the bottom terminal of said winding;

m. a second resistor connected to the collector of said first signal transistor, and to the base of said second signal transistor;

n. a third resistor connected to the base and the emitter of said second signal transistor;

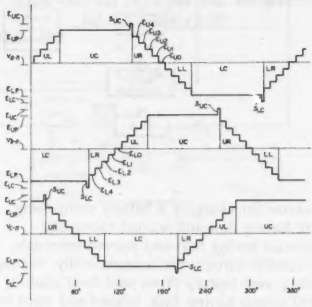
o. a third capacitor connected in parallel to said third resistor, and across the base-emitter junction of said second signal transistor;

p. and a common connection of the collector of said second signal transistor with the base of the oscillating transistor of said blocking oscillator.

3,889,174
APPARATUS FOR GENERATING THREE-PHASE SINUSOIDAL VOLTAGES

Thomas M. Corry, Goleta, Calif., assignor to General Motors Corporation, Detroit, Mich.

Filed July 3, 1974, Ser. No. 485,435
Int. Cl. H02m *7/52*
U.S. Cl. 321—9 R **2 Claims**



1. A three-phase inverter for generating sine-wave voltages at a preselected frequency across a set of three-phase line conductors from a unidirectional voltage source having a center tap coupled to a reference potential comprising: a first inverter connected between the source and the line conductors for producing flat-topped output voltage segments alternating between an upper potential above a reference potential and a lower potential below the reference potential at a rate three times the desired frequency and developing three-phase, full-wave, flat-top voltages on the conductors at the desired frequencies, each segment extending over an interval greater than 60 electrical degrees and being terminated by a first commutating voltage on the respective line conductor; a second inverter connected to the source and operating in synchronism with the first inverter for producing at its output signal-phase, flat-top voltages alternating between the upper and lower potential at a rate three times the desired frequency, each half cycle of the singal-phase, flat-top voltage being terminated by a second commutating voltage applied to the output of the second inverter; an inductor having an input tap connected to the output of the second inverter, a low voltage tap connected to the reference potential and a plurality of intermediate voltage taps between the low voltage tap and the input tap, whereby alternating flat-top voltage excitation is applied across the input and low voltage taps, the inductor further having a step-up tap in voltage multiplying position in relation to the flat-top voltage; a voltage distributor including a first channel having an input and means for selectively coupling said input to the line conductors in synchronism with the first inverter and a second channel having an input and means for coupling said input to the line conductors in synchronism with the first inverter; means or connecting the low voltage and intermediate taps to the inputs of each of the first and second channels during the period said channels are coupled to a respective line conductor in ascending and descending order in synchronism with the first inverter to approximate on the line conductors, in relation to the reference potential, a balanced and symmetrical voltage; means for momentarily coupling the step-up tap to the inputs of each channel, respectively, at the beginning of the period said channels are coupled to a respective line conductor to supply the first commutating voltage to commutate the first inverter;

and means for momentarily coupling a respective one of the line conductors having a flat-top voltage segment thereon to one of the intermediate taps of the inductor at the end of each half cycle of the single-phase, flat-top voltage to generate the second commutating voltage at the input tap of the inductor for commutating the second inverter.

3,889,175

DRIVING DEVICE FOR THYRISTOR TYPE AC-DC CONVERTER

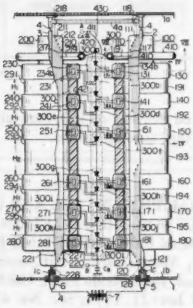
Tokio Isogai; Eiichi Isikawa; Keiji Fukushi; Hisao Amano; Fumio Ogata, and Norio Ikemoto, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 10, 1973, Ser. No. 404,871

Claims priority, application Japan, Oct. 12, 1972, 47-102471

Int. Cl. H02m *1/08, 7/24*

U.S. Cl. 321—27 R **17 Claims**



1. A driving device for a thyristor type AC-DC converter, comprising

at least one insulating cylinder having a plurality of conductive layers constituting a capacitor formed therein and near at least one end thereof disposed nearer the high voltage terminal of said device, the innermost one of said conductive layers being extended midway of said cylinder;

a primary conductor passing through said insulating cylinder at the center thereof and connected with a pulse generator; and

a plurality of transformer units stacked one upon another and arranged in skewered condition on said insulating cylinder, each said unit having a magnetic core with a plurality of secondary windings wound thereabout which windings supply gating voltages for the gates of thyristors connected in series,

wherein said innermost conductive layer is electrically insulated from said primary conductor and grounded toward said high voltage terminal.

3,889,176

REACTIVE REGULATOR

Ronald Harold Randall, Cuba, N.Y. assignor to ACME Electric Corporation, Cuba, N.Y.

Filed Oct. 10, 1973, Ser. No. 405,020

Int. Cl. G05f *1/12, 1/46*

U.S. Cl. 323—8 **21 Claims**

1. A regulator circuit comprising, in combination, first and second input terminals adapted to be energized from an alternating voltage source,

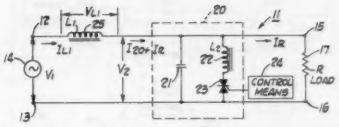
first and second output terminals adapted to be connected to a load,

first and second reactive means of opposite reactive sign,

first means to connect said first reactive means effectively in circuit with said input and output terminals,

switch means to connect said second reactive means effectively in circuit with said input and output terminals,

said second reactive means being in the order of one-half the impedance of said first reactive means,



and means to control the percentage of a complete cycle that said switch means is conducting to control the reactive current through said second reactive means to combine with the current through said first reactive means to make the total effective reactive current for each complete cycle either inductive or capacitive to control the output of said regulator circuit.

3,889,177

POWER SUPPLY HAVING SUBSTANTIALLY CONSTANT OUTPUT DURING LOAD SWITCHING

Charles Nelson Fendrich, Jr., Elizabethtown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 264,090, June 15, 1972, abandoned. This application Sept. 24, 1973, Ser. No. 400,436

Int. Cl. H02m *7/20*

U.S. Cl. 323—17 **6 Claims**

1. A power supply comprising an input source of unregulated D.C. voltage,

means coupling the input source to an output including,

switching means between the input source and the output, a source of regularly recurrent pulses,

means responsive to said pulses for rendering the switching means operative to connect the input source to the output for a time depending on the width of each pulse,

said source of regularly recurrent pulses being jointly responsive to the instantaneous voltage amplitude of the input source and the voltage amplitude at the output for adjusting the width of the pulses for regulating the output voltage,

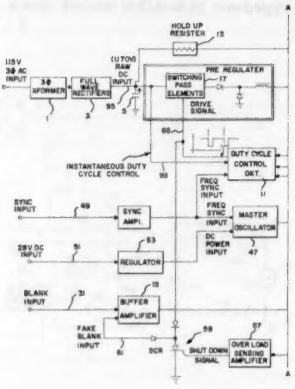
wherein the source of regularly recurrent pulses includes a sawtooth waveform generator with the slope of the waves dependent on the instantaneous voltage of the input,

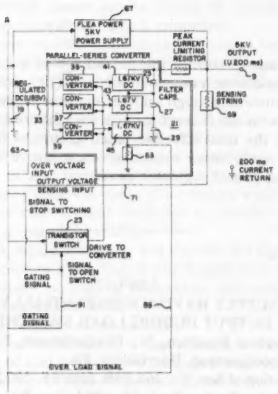
means for sensing the voltage at the output,

means for providing an error voltage having an amplitude dependent upon variations from a predetermined voltage at the output,

and means for comparing the sawtooth waves with the error voltage to produce said regularly recurrent pulses,

wherein the means coupling the input source to the output comprises a plurality of driven voltage converters with their inputs connected in parallel to the switching means and their outputs connected in series voltage adding





relation,

a source of oscillations,

and means controlled by said source of oscillations for driving said converters in synchronism.

3,889,178

WELDING CONTROL CIRCUIT AND METHOD

Robert V. Jackson, Los Angeles, Calif., assignor to McCulloch Corporation, Los Angeles, Calif.

Continuation of Ser. No. 177,613, Sept. 3, 1971, abandoned. This application July 23, 1973, Ser. No. 381,473

Int. Cl. G05f *1/44;* **B23k** *9/06*

U.S. Cl. 323—22 SC **20 Claims**

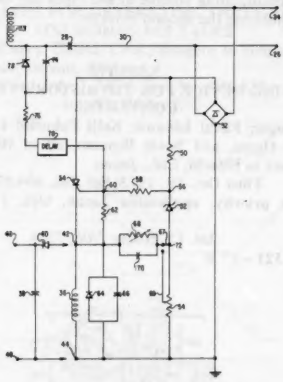
1. A voltage regulator comprising:

a variable voltage source of current pulses;

switch means and a load impedance connected in series with said source;

means for sensing the voltage across said load impedance; and,

means for maintaining load voltage at a substantially constant value notwithstanding variations in the voltage of said source of current pulses by normally biasing said switch means into conduction for a predetermined portion of all of said pulses at the terminal end thereof and by opposing the biasing of said switch means sufficient to thereby bias said switch means out of conduction for said



predetermined portion of less than all of said pulses in response to said sensing means.

3,889,179

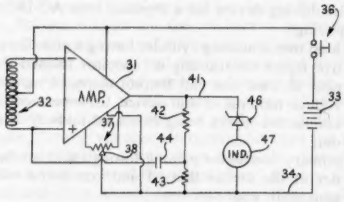
DIRECTIONAL PICKUP COIL AND OSCILLATOR APPARATUS FOR THE LOCATION OF BURIED ELECTRICALLY CONDUCTING ELEMENTS

Percy H. Cutler, Menlo Park, Calif., assignor to Cranleigh Electro-Thermal, Inc., Menlo Park, Calif.

Filed Jan. 21, 1974, Ser. No. 434,919

Int. Cl. G01v *3/08;* **H03b** *5/00*

U.S. Cl. 324—3 **2 Claims**



1. A locator for a buried conductor having alternating current passing there-through, comprising

a directional pickup coil having a center tap,

an operational amplifier having negative and positive input terminals connected across said pickup coil, an output terminal, offset voltage terminals and a first and a second amplifier power terminal,

a power supply having first and second power supply terminals, said first or positive power supply terminal connected to said first amplifier power terminal and to said center tap, said second or negative power supply terminal connected to said second amplifier power terminal,

a first resistor connected to said output terminal,

a second resistor connected between said first resistor and said second power supply terminal,

a capacitor having one side connected to the juncture between said resistors and another side connected to said positive input terminal,

said resistors and said capacitor comprising a feedback circuit for said amplifier for establishing a one-shot multivibrator amplifier output dependent on coil signal input of said coil created by the alternating current through said conductor, the frequency of said one-shot multi-

vibrator amplifier output increasing with closer proximity of said coil to the magnetic field of said conductor,

an offset voltage potentiometer across said offset voltage terminals and having a movable contact,

said movable contact connected to said second power supply terminal, movement of said movable contact adjusting the threshold sensitivity of said amplifier,

an indicator connected to said output terminal and to said second power supply terminal for producing observable indications of the frequency of said one-shot multivibrator amplifier outputs,

and a casing enclosing all of the foregoing elements except said conductor.

3,889,180

AIR POLLUTION MEASURING EQUIPMENT

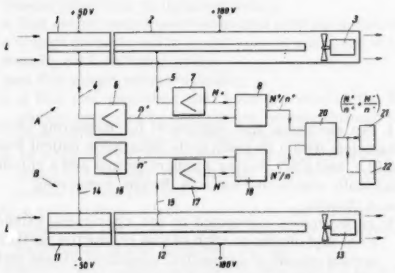
Joseph Eichmeier, Munich, Germany, assignor to Constantin Graf Von Berckheim, Weinheim an der Bergstrasse, Germany

Filed Dec. 12, 1973, Ser. No. 426,628

Claims priority, application Germany, Dec. 16, 1972, 2261792

Int. Cl. G01n *27/00*

U.S. Cl. 324—33 **8 Claims**



1. Equipment for measuring air pollution, comprising, in combination, first measurement means for measuring the concentration of small ions of a predetermined sign in said air and furnishing a corresponding first measurement signal; second measurement means for measuring the concentration of large ions of the same sign in said air and furnishing a corresponding second measurement signal; and first dividing circuit means having a first input connected to said first measurement means, a second input connected to said second measurement means and a first dividing circuit output, for furnishing a first output signal corresponding to the ratio of said signals at said first and second inputs at said first dividing circuit output, said first output signal constituting a measure of said air pollution.

3,889,181

MAGNETIC SYSTEM FOR DISCRIMINATING BETWEEN VEHICLES AND PERSONNEL BASED UPON THEIR CHARACTERISTIC FREQUENCY SIGNATURES

Charles B. Greer, Clifton, Va., assignor to United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 8, 1974, Ser. No. 449,429

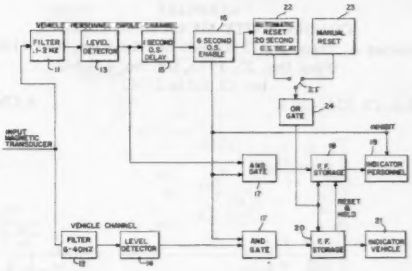
Int. Cl. G01r *33/00*

U.S. Cl. 324—41 **3 Claims**

1. A moving object detector and discriminating system which indicates the presence of vehicles and persons and differentiates therebetween comprising:

a first channel means for indicating the presence of a moving vehicle including first bandpass filter input means adapted to pass an input signal having a frequency within a first selected frequency range; a first level detector electrically connected to said first bandpass filter input means, said first level detector having a selected threshold level and adapted to block signals of lesser amplitude and to pass signals having an amplitude at said threshold level and above; a moving vehicle presence indicator; and first channel interconnection means adapted to interconnect the output of said first level detector to said moving vehicle presence indicator to activate same;

a second channel means for indicating the presence of a moving person including second bandpass filter input means adapted to pass an input signal having a frequency within a second selected frequency range; a second level detector electrically connected to said second bandpass filter input means, said second level detector having a



selected threshold level and adapted to block signals of lesser amplitude and to pass signals at said threshold level and above; a moving person presence indicator and second channel interconnection means adapted to interconnect the output of said second level detector to said moving person presence indicator to activate same;

means for simultaneously applying an input signal, having frequency characteristics representative of the presence of moving objects of the vehicle and person variety, to said first and second channel means;

and channel interrupter means adapted to block passage of the output signal of said second level detector to said moving person presence indicator, said channel interrupter means being responsive to the simultaneous occurence of output signals from said first and second level detectors.

3,889,182

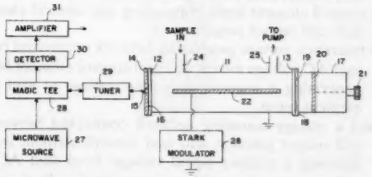
RESONANT WAVEGUIDE STARK CELL

Wesley C. Easley; William F. White, both of Hampton, and George A. Wingfield, Newport News, all of Va., assignors to The United States of America as represented by the United States National Aeronautics and Spaced Administration Office of General Counsel-Code GP, Washington, D.C.

Filed Apr. 10, 1974, Ser. No. 459,736

Int. Cl. G01r *27/04*

U.S. Cl. 324—58.5 A **7 Claims**



1. A resonant waveguide Stark cell for use in a Stark modulated microwave spectrometer comprising:

a waveguide cavity whose sides are made from an electrically conductive material, said sides forming a first electrode for said Stark cell;

a first microwave reflector located at one end of said cavity; a small coupling iris in said first microwave reflector for allowing microwave energy to flow into and out of said cavity;

a second microwave reflector located at the other end of said cavity;

means for maintaining a gas-tight compartment within said cavity without appreciably interferring with the flow of the microwave energy; and

ports in said sides of said cavity for allowing sample gas to flow into and out of said compartment.

3,889,183

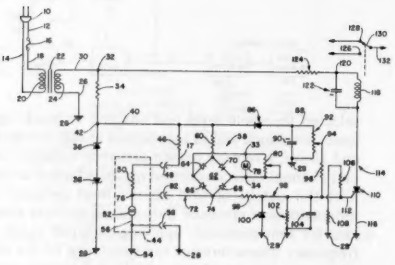
CONDUCTIVITY MEASURING CIRCUIT

Horace A. Teass, Jr., 73 Remsen St., Brooklyn, N.Y. 11201

Filed Dec. 27, 1973, Ser. No. 428,842

Int. Cl. G01n *27/42*

U.S. Cl. 324—30 R **6 Claims**



1. A circuit for monitoring the conductivity of a solution comprising:

a negative temperature coefficient thermistor;

a conductivity cell connected in series with said thermistor, whereby at the cell output junction formed between said thermistor and said cell there appears an AC signal voltage whose magnitude is proportional to the true conductivity of the solution to be monitored;

a meter network connected in parallel with said thermistor and in series with said cell for indicating the true conductivity of the monitored solution;

a control element connected in parallel with said cell and in series with said thermistor, whereby said control element receives said AC signal voltage and detects the true conductivity of the monitored solution,

regulated AC voltage means for supplying energy to said thermistor, cell, meter network and control element;

a control element input connecting said control element to said cell output junction;

a reference voltage generating network connected between said AC voltage means and said control element input for generating a negative reference voltage at said control element input;

and a voltage summing network connected between said cell output junction and said control element input for deriving a positive signal voltage from said AC signal voltage, summing said positive signal voltage and said negative reference voltage and feeding the resultant voltage to said control element input.

3,889,184

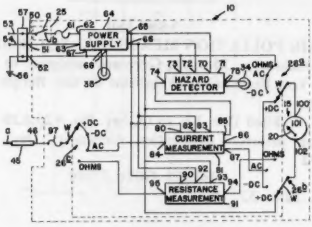
ELECTRONIC HAZARD TESTER FOR MEDICAL FACILITIES

John M. Bass, 13533 Larkin Dr., Minnetonka, Minn. 53343

Filed Mar. 25, 1974, Ser. No. 454,328

Int. Cl. G01r *27/02*

U.S. Cl. 324—62 **14 Claims**



1. An electronic test instrument for measuring electrical parameters within an electrically susceptible patient location (ESPL), said ESPL having a patient ground and a plurality of electrically conductive surfaces therein, comprising:

a. a chassis;

b. probe means connected to and operatively extendable from said chassis to each of said conductive surfaces for sensing electrical parametric conditions of said surfaces when in electrical contact therewith; and

c. electronic circuit means mounted to said chassis for measuring and for determining hazardous electrical conditions within said ESPL, said circuit means comprising:

i. a signal input operatively connected with said probe means for receiving said sensed electrical conditions therefrom;

ii. reference means operatively connecting circuits within said electronic circuit means with said patient ground for electrically referencing the circuits thereto;

iii. current measurement means operatively connected with said signal input to receive said sensed electrical conditions therefrom, for measuring electrical current flow potentially available through an electrically susceptible patient from said conductive surface probed by said probe means to said patient ground;

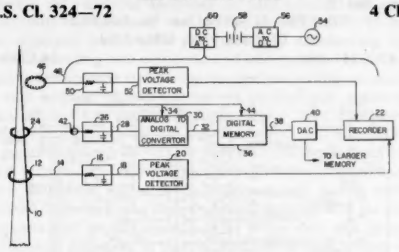
iv. hazard detector means operatively connected with said current measurement means for providing a warning output signal when the magnitude of said measured electrical current flow exceeds a predetermined microshock hazard level; and

v. resistance measurement means in circuit with said signal input for measuring the electrical resistance between said patient ground and any of said electrically conductive surfaces operatively contacted by said probe means, by causing current flow through that conductive surface in contact with said probe means to said patient ground, and by analyzing electrical characteristics of such caused current flow, said resistance measurement means further having means for variably limiting the magnitude of said caused current to levels predetermined as non-hazardous to an electrically susceptible patient within the ESPL.

3,889,185
LIGHTNING CURRENT MEASURING SYSTEMS

Ronald J. Wojtasinski, Cocoa Beach; James H. Jones, Titusville, and Raymond V. Lisle, Indialantic, all of Fla., assignors to The United States of America as represented by the United States National Aeronautics and Space Administration, Office of General Counsel-Code GP, Washington, D.C.

Filed Apr. 15, 1974, Ser. No. 461,073
Int. Cl. G01r *31/02*
U.S. Cl. 324—72 **4 Claims**



1. An apparatus for monitoring and analyzing electrical currents produced by lightning strikes comprising:

a. an electrically conductive mast having currents produced therein responsive to lightning strikes,

b. a first circuit means coupled to said mast for generating a voltage proportional to a peak current generated in said mast by each lightning strike,

c. said first circuit means including:

i. a first coil encircling said mast for sensing the flux change produced by said current flowing through said mast and generating a voltage responsive thereto,

ii. an integrator coupled to said first coil for generating an integrated voltage proportional to said flux change sensed by said first coil,

iii. a peak voltage detector coupled to said integrator for generating a voltage having an amplitude proportional to the peak of said integrated voltage,

d. a second circuit means coupled to said mast for generating a digital signal representative of the wave shape of said current generated in said mast by each lightning strike,

e. said second circuit means including:

i. a second coil encircling said mast for sensing the flux change produced by said current flowing through said mast caused by a lightning strike and generating a voltage responsive thereto,

ii. a second integrator coupled to said second coil for generating an integrated voltage directly proportional to the amplitude of said current flowing in said lightning mast,

iii. an analog to digital convertor coupled to said second integrator for sampling said integrated voltage at a predetermined rate and generating digital signals corresponding to said integrated voltage, and

f. means for recording said voltage generated by said first circuit and said digital signals produced by said second circuit for producing a record representing the wave shape of said current produced in said mast by said lightning strike and the peak current produced.

3,889,186
ALL DIGITAL PHASE DETECTOR AND CORRECTOR

Robin J. Larson, Norcross, Ga., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 27, 1973, Ser. No. 419,329
Int. Cl.[2] G01R *25/00;* **H03D** *13/00*
U.S. Cl. 324—83 D **6 Claims**

1. An apparatus for detecting and correcting phase error comprising:

a frequency source;

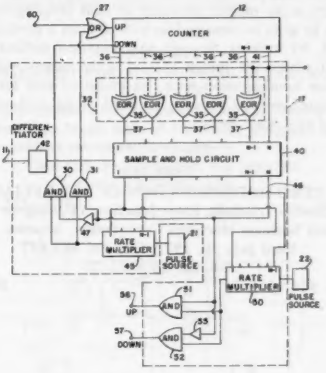
a binary counter coupled to said frequency source and incrementing at a rate controlled by said frequency source;

a source of input pulses;

means coupled to said pulse source for detecting a transition in said input pulses;

means responsive to said transition-detecting means and coupled to said counter for detecting the error, at the instant of said transition, between the value in said counter and a predetermined value and for converting the value in said counter to a value representing magnitude and direction of phase error when compared with the phase of said input pulse; and

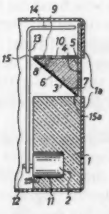
means responsive to said error-detecting means and coupled to said counter for varying said counter incrementing rate at a rate proportional to said error, thereby correcting said error.



3,889,187
INDICATING INSTRUMENT

Willy Kisselmann, Grunwald; Fritz Rumpelein, Munich, and Paul Kopf, Unterhaching, all of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Sept. 14, 1970, Ser. No. 71,918
Claims priority, application Germany, Sept. 13, 1969, 1946507; Nov. 5, 1969, 1955609; Nov. 5, 1969, 1955610; Nov. 5, 1969, 1955608
Int. Cl. G01r *15/00, 1/08*
U.S. Cl. 324—114 **42 Claims**



1. An indicating instrument, comprising a housing; a prism installed in said housing and having at least one mirrored

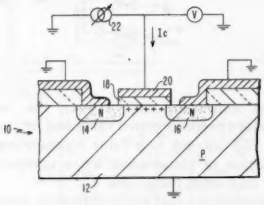
light-reflecting surface and a plurality of additional surfaces including an exposed surface and a second additional surface, said surfaces meeting each other along a plurality of elongated edges, at least said mirrored ligh-reflecting surface being a plane surface; a pointer mounted in said housing for pivotal movement about a predetermined axis, said pointer having an elongated terminal which is adjacent to said prism, at least substantially parallel to said axis and to said second additional surface and at least substantially normal to said edges in each position of said pointer; means for pivoting said pointer; and stationary scale means provided in said housing in such a position so as to be observable, with at least a portion of said terminal, by looking through said exposed surface of said prism at which the image of said scale means will have a rectilinear configuration with the image of said terminal of said pointer moving parallel to itself along said rectilinear image of said scale means.

3,889,188

TIME ZERO DETERMINATION OF FET RELIABILITY

David Charles Trindade, Essex Junction, Vt., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed July 30, 1973, Ser. No. 383,857
Int. Cl. G01r *31/22*
U.S. Cl. 324—158 T **10 Claims**



1. The method for predicting the failure rate of metal-insulator-semiconductor devices caused by variations in manufacturing process parameters, comprising the steps of:

A. applying for a relatively short period of time, a first current limited voltage across the insulator of a first portion of a group of substantially identical metal-insulator-semiconductor devices, said voltage having a magnitude substantially equal to the saturation voltage of said semiconductor device;

B. determining the average percentage of said first portion of said devices which exhibit metal-to-semiconductor voltage breakdown under said first voltage at the end of said short period of time;

C. applying for an extended period of time a second voltage across the insulator of at least a second portion of said group of devices, said second voltage having a magnitude substantially lower than said first voltage;

D. determining the average percentage of said second portion of said devices which exhibit metal-to-semiconductor voltage breakdown under said second voltage at the end of said extended period of time;

E. correlating the percentage of devices exhibiting voltage breakdown in said short and extended periods of time to determine the specific relationship between said percentages; and

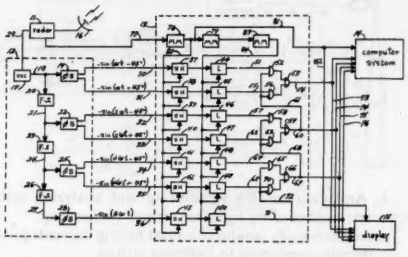
F. predicting the average percentage of devices expected to exhibit voltage-to-semiconductor breakdown at said extended period of time for a different group of metal-insulator-semiconductor devices manufactured under different manufacturing process parameters by determining the average percentage of at least a portion of said different group of devices exhibiting voltage breakdown after applying said first voltage for said relatively short period of time and determining the expected average percentage of devices to exhibit breakdown at said extended period of time by applying the specific relationship determined in step E to said average percentage of devices exhibiting voltage breakdown in said portion of said group of different devices.

3,889,189

DIGITAL TIME MEASUREMENT SYSTEM

Tenny D. Lode, 3270 Cherryridge Rd., Cherry Hills Village, Colo. 80110

Filed Feb. 21, 1974, Ser. No. 444,562
Int. Cl. G04f *9/00*; **G01s** *9/04*
U.S. Cl. 324—186 **24 Claims**



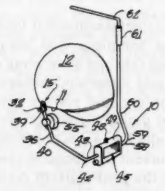
1. A digital time measurement system including a source of a plurality of different related periodic signals, a source of a time signal whose time is to be measured, means for sampling the values of said plurality of periodic signals in response to a signal from said time signal source and generating a plurality of logical signals from the sampled values of said plurality of periodic signals, said plurality of logical signals comprising an intermediate code representation of a digital data value corresponding to the measured time such that not more than one of said logical signals need change between any two adjacent digital data values, digital data receiving means, and means connecting said plurality of logical signals to said digital data receiving means.

3,889,190

COMMUNICATIONS TRANSCEIVER ADAPTED FOR MOUNTING ON A HELMET

Charles Palmer, 1370 N.E. 171st St., North Miami Beach, Fla. 33162

Filed June 18, 1974, Ser. No. 480,470
Int. Cl. H04b *1/38*
U.S. Cl. 325—16 **3 Claims**



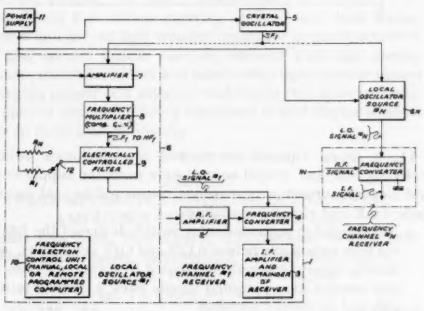
1. A communications transceiver apparatus adapted for mounting on a helmet type of headgear comprising a clamp mechanism adapted to be detachably attached to a bottom side edge of said helmet in a position normally overlying an individual's ear when the helmet is worn by the individual; tubular rod having one end pivotally attached to said clamp mechanism with the opposite end projecting downwardly and outwardly therefrom to a position substantially below and in front of said helmet adjacent an individual's mouth; means adjustably selecting the position of said tubular rod about said

clamp mechanism; a transceiver device mounted on said terminal end of said tubular rod in a position substantially in front of an individual's mouth, said transceiver including a control switch projecting from a surface thereof and adapted to activate and de-activate said transceiver; said transceiver including a channel selector knob projecting from a surface thereof and adapted to be operated by an individual to select one of a plurality number of available channels for the transmitting and receiving of communications on the transceiver device; an earphone mounted on said tubular rod in close proximity to said clamp mechanism and in position to overlie an adjacent individual's ear; electrical conducting means interconnecting said earphone and said transceiver device; an elongated antenna rod having one end projecting outwardly of a side surface of said transceiver device, said antenna rod projecting from said transceiver device in a direction upwardly and rearwardly toward said helmet and terminating in a position spaced above said helmet; a coil housing affixed to said terminal end of said antenna rod an in electrical connection therewith; and a second antenna rod having one end affixed to the opposite end of said coil housing with the second antenna rod projecting outwardly therefrom in a generally horizontal direction to overlie said top of said helmet when said transceiver device is in position in front of said individual's mouth.

3,889,191
GENERATOR FOR LOCAL OSCILLATOR SIGNALS

David E. Hershberg, Ridgewood; Arthur H. Chaplin, Wayne, and Joseph E. Dewland, Secaucus, all of N.J., assignors to International Telephone and Telegraph Corporation, Nutley, N.J.

Division of Ser. No. 306,469, Nov. 14, 1972, Pat. No. 3,810,083. This application Oct. 12, 1973, Ser. No. 405,952
Int. Cl. H04b 7/08
U.S. Cl. 325—307 **4 Claims**



1. An arrangement to provide a different local oscillator signal for each of N receivers contained in a station, where N is equal to an integer greater than one, each of said N receivers receiving a different one of N frequency channels, adjacent ones of said N frequency channels being spaced from each other by a given frequency value, said arrangement comprising:

a highly stable oscillator having an output to provide a signal having a frequency equal to said given frequency value;

first means having an output and an input coupled to the output of said oscillator, said first means generating N signals, each of said N signals having a different frequency related to said given frequency value, adjacent ones of said different frequencies being spaced by said given frequency value;

N filters each having an output and an input coupled to the output of said first means, each of said N filters being tuned to a different one of said N signals;

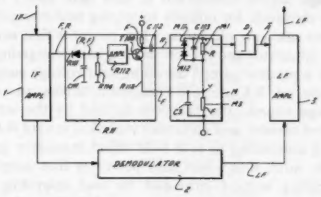
an N × N matrix having N outputs each coupled to a different one of said N receivers, N signal inputs each coupled to the output of a different one of said N filters and N control inputs; and

second means having N outputs each coupled to a different one of the N control inputs of said matrix for control thereof to provide simultaneously a different local oscillator signal for each of said N receivers.

3,889,192
ARRANGEMENT FOR SUPPRESSING NOISE IN AN FM RECEIVER

Heinz Schiebelhuth, Frankfurt am Main, and Herbert Bauer, Offenbach am Main, both of Germany, assignors to Braun AG, Frankfurt am Main, Germany

Filed Oct. 16, 1973, Ser. No. 406,781
Int. Cl. H04b 1/10
U.S. Cl. 325—348 **8 Claims**



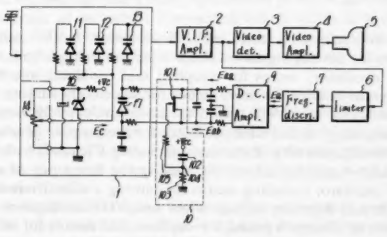
1. In an FM receiver having an intermediate frequency stage and a low frequency stage, a noise suppression arrangement, comprising, in combination, first circuit means connected to said intermediate frequency stage for furnishing a field strength signal;

noise measuring means connected to said intermediate frequency stage for furnishing a noise signal corresponding to AM signals, if present, in said intermediate frequency stage; and switching means connected to said first circuit means and said noise measuring means, for furnishing an enabling signal for enabling said low frequency stage only in the simultaneous presence of said field strength signal and absence of said noise signal.

3,889,193
AUTOMATIC FREQUENCY CONTROL CIRCUIT

Tadao Sasaki; Yasuji Kato, and Toshiaki Meguro, all of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jan. 16, 1974, Ser. No. 433,796
Claims priority, application Japan, Jan. 23, 1973, 48-9685
Int. Cl. H04b 1/16
U.S. Cl. 325—419 **1 Claim**



1. An automatic frequency control circuit for tuning apparatus, the tuning apparatus having an electronically variable

frequency generating means, and the automatic frequency control circuit being responsive to the output produced by a frequency discriminator supplied with IF signals, comprising:

a variable capacitance diode coupled to said variable frequency generating means, the frequency generated by said variable frequency generating means being a function of the capacitance value;

a differential output DC amplifier connected to said frequency discriminator and having first and second output terminals across which said variable capacitance diode is coupled, said differential output DC amplifier providing first and second voltages at said first and second output terminals, respectively, having substantially the same magnitude and opposite polarity in accordance with the frequency of the IF signals, said variable capacitance diode exhibiting a capacitance value determined by the difference between said first and second voltages;

a field effect transistor having source and drain electrodes interconnecting said first and second output terminals and a gate electrode for selectively receiving an energizing voltage to thereby render said field effect transistor conductive; and

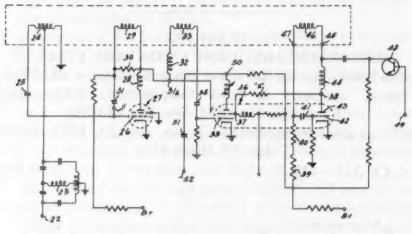
a voltage supply connected to said field effect transistor gate electrode for initially supplying said energizing voltage to said gate electrode when power is first supplied to said apparatus and for terminating said energizing voltage after a predetermined duration, said voltage supply comprising an R-C circuit connected across an operating voltage source, the junction defined by the series connected resistor and capacitor included in said R-C circuit being connected to said field effect transistor gate electrode, such that when said power is first supplied, the operating voltage provided by said operating voltage source is applied to said junction through said capacitor, the junction voltage decreasing as said capacitor is charged.

3,889,194

TELEVISION TUNER TO REDUCE HARMONIC RADIATION INTERFERENCE

Suhas Prataprao Bagwe, Forest Park, Ill., assignor to Admiral Corporation, Chicago, Ill.

Filed Oct. 2, 1972, Ser. No. 294,101
Int. Cl. H04b *1/26*
U.S. Cl. 325—436 **6 Claims**



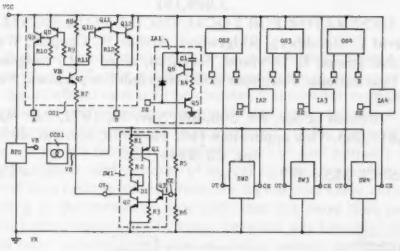
1. In a television tuner, a VHF oscillator, a VHF mixer, means for developing an oscillator injection voltage from said VHF oscillator, means for coupling said oscillator injection voltage to said VHF mixer, means for selectively varying the frequency of said VHF mixer, means for selectively varying the frequency of said VHF oscillator for the purpose of selecting one of a plurality of channels, including Channels 6 and 8, and said means for selectively varying the frequency of said VHF oscillator including means for causing a selective reduction in said injection voltage when said VHF oscillator is set for one of Channels 6 and 8 reception, said means for selectively varying the frequency of said VHF oscillator comprising switching means for switching one of the circuit elements of the oscillator out of the oscillator circuit and for switching into the oscillator circuit another circuit element having a different oscillation parameter from said one element, said circuit elements comprising inductance coils, each of said inductance coils being designed to produce specific oscillation frequencies when coupled into said oscillator for the purpose of channel selection and said inductance coil associated with the selection of one of Channels 6 and 8 has a resistance value selected for the purpose of reducing Channel 6 or 8 radiation interference, the resistance value of said inductance coil being substantially higher than the average resistance value of the inductance coils associated with selection of other channels.

3,889,195

INTERLOCKED PLURAL CHANNEL SWITCHES AND CONTROLLABLE SWITCH DEVICES FOR USE THEREIN

Karl Elshuber, Schnotting near Gemeinde Kirchdorf, Germany, assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 12, 1973, Ser. No. 331,411
Int. Cl. H04b *1/16*
U.S. Cl. 325—464 **11 Claims**



11. A plural channel interlocked semiconductor switch including first and second energization potential supply lines and electric current source means connected to said supply lines; each said channel including:

a. a controllable semiconductor switch device of the latching type switchable between ON and OFF conditions, and having supply terminals connected to respective ones of said energization potential supply lines, a control terminal, and an output terminal;

b. said switch device adapted to have first and second conductive states such that current flow from said current source through said switch device when in said first conductive state establishes a voltage drop between said supply lines lower than a predetermined holding voltage when said switch device is in said second conductive state corresponding to said ON condition;

c. means for selectively applying actuating signals to the control terminals of said switch devices to switch a selected switch device to said first conductive state initially to establish a voltage drop between said supply line lower than said predetermined holding voltage and upon termination of said actuating signal to latch said selected switch device in said second conductive state;

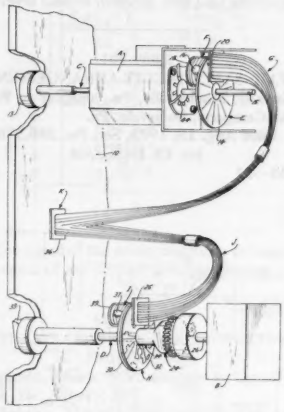
d. and wherein the output terminal of each switch device is connected to the input of a respective transistor amplifier for producing an output signal when said switch device is in said ON condition.

3,889,196

VHF AND UHF FIBER OPTIC CHANNEL INDICIA DISPLAY HAVING A COMMON DISPLAY AREA

Richard D. Gibson, Wilbraham, and Robert D. Whelan, W. Springfield, both of Mass., assignors to General Instrument Corporation, Clifton, N.J.

Filed Mar. 29, 1974, Ser. No. 455,985
Int. Cl. G08b 5/36; H04b 1/06
U.S. Cl. 325—455 16 Claims



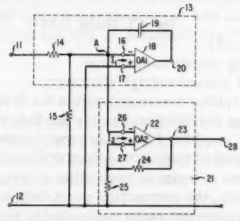
1. A channel indicia display for television receivers or the like having first and second frequency band tuners and separate movable control shafts adapted to respectively condition the tuners, the display comprising first and second movable indicia carrying elements each of which is operably connected to a different one of said control shafts to be driven thereby, a display window, first light transfer means for optically connecting said first indicia carrying element with said display window and second light transfer means for optically connecting said second indicia carrying element with said display window, each of said first and said second light transfer means having an output end adjacent said display window, said output ends of said means being integrated at said display window so as to form a single display.

3,889,197

TIMER APPARATUS UTILIZING OPERATIONAL AMPLIFIER INTEGRATING MEANS

Thomas Guy Duff, Shrewsbury, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 12, 1974, Ser. No. 460,348
Int. Cl. H03k 5/159, 17/26
U.S. Cl. 328—55 16 Claims



1. A circuit for developing an output signal a predetermined time after the application of an applied input signal comprising:

integration means, responsive to said applied signal, having a predetermined linear range of integration in which said integrator develops a signal representative of the mathematical integral of said applied signal, said integration means developing a signal at a terminal thereof which is at virtual ground only when said integration means is within said linear range of integration; and

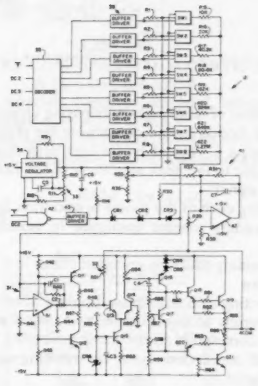
comparator means responsive to the difference between said signal at said terminal and an applied reference signal for developing said output signal.

3,889,198

VOLTAGE WAVEFORM GENERATOR INCLUDING FEEDBACK ARRANGEMENT FOR RESTORING VOLTAGE TO INITIAL CONDITION

John T. Lighthall, Brockville, Ontario, and Robert W. Thomas, Maitland, Ontario, both of Canada, assignors to GTE Automatic Electric (Canada) Ltd., Brockville, Ontario, Canada

Filed Feb. 22, 1974, Ser. No. 444,888
Int. Cl.[2] H03K 3/04, 5/00; G06G 7/12
U.S. Cl. 328—59 11 Claims



1. Waveform generating apparatus comprising

integrating means having an input connection and an output connection;

a source of reference potential;

a plurality of switch means;

a like plurality of resistances;

a like plurality of series circuits each connected between said source of reference potential and the input connection of the integrating means, each series circuit including one of the switch means and one of the resistances in series;

said integrating means being operable to produce an output voltage at its output connection which varies at a rate determined by the combination of the voltage applied at its input connection through a resistance and the value of the resistance;

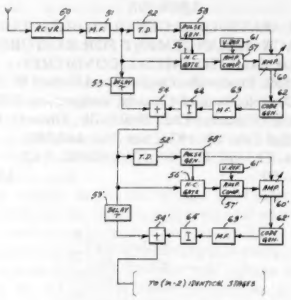
control means coupled to said plurality of switch means and operable to close and open the switch means of said plurality in a predetermined sequence whereby the value of resistance between the source of reference potential and the input connection of the integrating means is varied; and

restoring means coupled to the output connection and to the input connection of the integrating means for producing a predetermined condition at the input connection which causes the integrating means to produce a predetermined voltage at its output connection.

3,889,199
METHOD AND APPARATUS FOR ADAPTIVELY SUPPRESSING UNWANTED LOBES IN A COMPRESSED CODED RADAR SIGNAL

Frank S. Gutleber, Little Silver, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 22, 1974, Ser. No. 472,323
Int. Cl. H03b *1/04*
U.S. Cl. 328—163 **9 Claims**

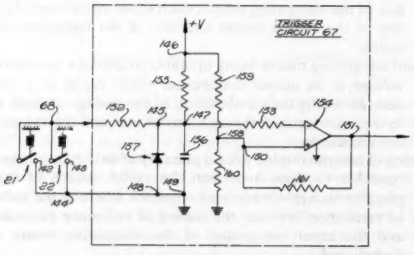


1. A method of adaptively eliminating unwanted lobes in a compressed, coded signal, comprising the steps of:
a. generating a train of pulses corresponding in amplitude and phase to the peak amplitude of the main lobes in said coded signal;
b. encoding each of the pulses in said train by the use of the same coding scheme employed to generate said coded signal;
c. compressing said now encoded pulses in a matched filter; and then
d. subtracting said compressed pulses from said coded signal, thereby to cancel from said coded signal the lobes which correspond to the lobes generated by the component of said coded signal contributing said peak amplitude signal.

3,889,200
TRIGGER CIRCUIT FOR BALL PROVER OR THE LIKE

Walter Fah Min Tyau, Orange, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Division of Ser. No. 304,997, Nov. 9, 1972, Pat. No. 3,832,883.
This application Jan. 21, 1974, Ser. No. 435,258
Int. Cl. H03b *1/00;* **H03k** *5/00*
U.S. Cl. 328—163 **2 Claims**

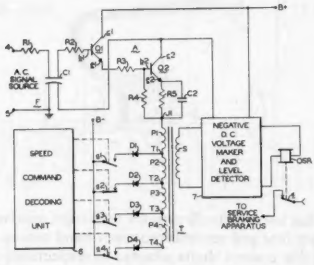


1. A trigger circuit comprising: first and second input leads; two switches connected in parallel between said leads; and a regenerative amplifier connected from said leads, said first lead being connected to a first junction, a D. C. source of potential, a first resistor connected from said first junction to said source, a second junction, a second resistor connected from said source to said second junction, said second lead being connected to a point of reference potential, a third resistor connected from said second junctionn to said point of reference potential, said regenerative amplifier including a differential amplifier having inverting and noninverting inputs and an output, a fourth positive feedback resistor connected between said noninverting input and said output, said second junction being connected to said noninverting input, and means connecting said first junction to said inverting input.

3,889,201
FAIL-SAFE CIRCUIT ARRANGEMENT

Reed H. Grundy, Murrysville, Pa., assignor to Westinghouse Air Brake Company, Swissvale, Pa.

Filed Aug. 15, 1973, Ser. No. 388,378
Int. Cl. H03f *3/04*
U.S. Cl. 330—21 **10 Claims**


A.C. SIGNAL SOURCE
SPEED COMMAND DECODING UNIT
NEGATIVE D.C. VOLTAGE MAKER AND LEVEL DETECTOR
TO SERVICE BRAKING APPARATUS

1. A fail-safe circuit arrangement comprising, a source of a.c. signals, a low-pass filter connected to said a.c. signal source, an amplifier, said amplifier having an input and an output, said input of said amplifier connected to said low-pass filter, a turns-ratio device, said output of said amplifier connected to said turns-ratio device, a load, a turns-ratio control device, said turns-ratio device connected to said load, and said turns-ratio control device selectively varying the turns-ratio of said turns-ratio device.

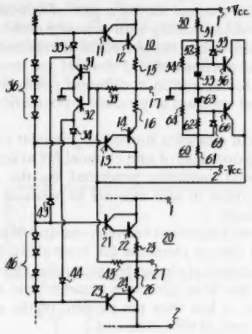
3,889,202
MUTING CIRCUIT

Tadao Suzuki, 3-22-22 Kamineguro, Meguro-ku, Tokyo, Japan

Filed Nov. 14, 1973, Ser. No. 415,740
Claims priority, application Japan, Nov. 20, 1972, 47-133529
Int. Cl. H03g *3/30*
U.S. Cl. 330—51 **8 Claims**

1. A muting circuit comprising:
a. first and second voltage sources;
b. a pre-amplifier connected across the first voltage source;
c. voltage detecting means for the first voltage source;
d. a power amplifier having an input terminal and first and second output transistors whose collector and emitter are connected in series to each other across the second voltage source, the connection point between said first and second transistors being connected to an output terminal;
e. first switching means connected to the bases of the first and second transistors, the output terminal and a reference point, and operative to clamp the base of the first and second transistors into a predetermined DC voltage in response to an output signal of the voltage detecting means; and

f. second switching means connected between the input terminal and the reference point, and operative to attenu-



ate a drive signal of the power amplifier in response to the output signal of the voltage detecting means.

3,889,203

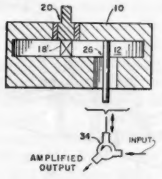
MULTI-AXIS CAVITIES FOR GUNN EFFECT AMPLIFIERS

Lester F. Eastman, Ithaca, N.Y., assignor to Cornell Research Foundation, Inc., Ithaca, N.Y.

Division of Ser. No. 249,274, May 1, 1972. This application Aug. 15, 1974, Ser. No. 497,579

Int. Cl. H03f *3/60, 3/10*

U.S. Cl. 330—56 **3 Claims**



1. A Gunn effect amplifier circuit, comprising electrically conductive means for defining an elliptical cavity bounded by two parallel elliptical planar surface and an elliptical ringlike surface joining the two planar surfaces at their respective peripheries, a doped Gunn effect device coaxially mounted in said cavity at one of the focus lines associated with the elliptical ringlike surface, means for applying DC bias voltage to said device, coaxial transmission line means coaxially located at the other focus line associated with said cavity serving as a conduit for input and output signals, and connector means external to said cavity coupled to said transmission line means for introducing an input microwave signal into said cavity and for simultaneously extracting an amplified microwave output signal therefrom.

3,889,204

DIGITAL CIRCUIT FOR THE CONTROL OF A VARIABLE FREQUENCY OSCILLATOR

Karl Schlosser, Planegg, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

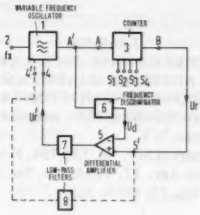
Filed Dec. 15, 1972, Ser. No. 315,503

Claims priority, application Germany, Dec. 23, 1971, 2164175

Int. Cl. H03b *3/04*

U.S. Cl. 331—1 A **5 Claims**

1. In apparatus for controlling the frequency of a variable frequency oscillator including a counter for counting the cycles of said oscillator and producing a first d.c. control voltage in response to the difference between the number of cycles thus counted during a predetermined time interval and the number corresponding to operation of said oscillator at a desired frequency, the combination comprising a frequency



discriminator for deriving a second d.c. voltage in response to the instantaneous frequency of said oscillator, and means for simultaneously connecting said first and second control voltages to said variable frequency oscillator for controlling the frequency thereof.

3,889,205

TEMPERATURE COMPENSATED ACOUSTIC SURFACE WAVE OSCILLATOR

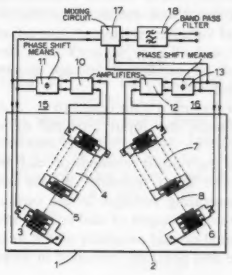
Richard Frank Mitchell, Kingston, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 8, 1974, Ser. No. 458,833

Claims priority, application United Kingdom, Apr. 9, 1973, 16917/73

Int. Cl. H03b *3/04, 21/00*

U.S. Cl. 331—41 **9 Claims**



1. An oscillator comprising a piezoelectric body having an acoustic surface wave propagation surface formed thereon, a first and a second pair of interdigital transducers, each said pair comprising a launching and a receiving transducer arranged on said acoustic surface wave propagation surface respectively to launch and receive acoustic surface waves in corresponding first and second acoustic surface wave propagation directions over said acoustic surface wave propagation surface, amplifying means connected respectively to amplify the output of the receiving transducer of each said transducer pair and to feed said amplified output to the corresponding said launching transducer to maintain a respective component oscillation in said pair, said first and second acoustic surface wave propagation directions being selected so that the corresponding temperature coefficients of the frequency of the respective component oscillation are of a significantly different non-zero value each of which is substantially constant with respect to normal manufacturing variations in the orientations of said transducers with respect to the crystallographic axes of said body, and output means for deriving an output oscillation whose frequency is either the sum or the difference of said

component oscillations, the respective frequencies of said component oscillations being selected in relation to their temperature coefficients of oscillation frequency so that the temperature coefficient of said output oscillation is substantially zero.

3,889,206

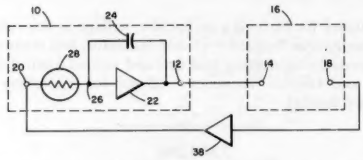
TWO AND THREE-PHASE OSCILLATORS WITH ALL-PASS NETWORK HAVING AMPLITUDE RESPONSIVE TIME CONSTANT

Arthur Mayer, Kew Gardens, N.Y., assignor to Astrosystems Inc., Lake Success, N.Y.

Continuation-in-part of Ser. No. 332,759, Feb. 15, 1973. This application Apr. 17, 1974, Ser. No. 461,733

Int. Cl. H03b *5/20, 27/00*

U.S. Cl. 331—45 **4 Claims**



1. An electronic oscillator comprising:

a. an integrator having input and output terminals,

b. an all-pass network having an input terminal coupled to the output terminal of said integrator and an output terminal, said all-pass network comprising a voltage inverter having an input coupled to the input terminal of said all-pass network, a capacitor coupled between the output of said voltage inverter and the output terminal of said all-pass network, and a variable resistive means coupled between the input and output terminals of said all-pass network, said variable resistive means adjusting the time constant of said all-pass network as a function of the amplitude of an oscillating voltage generated by said oscillator, and

c. an amplifier having a gain equal to 3 and input and output terminals, the input terminal of said amplifier being coupled to the output terminal of said all-pass network and the output terminal of said amplifier being coupled to the input terminal of said integrator; said oscillator generating voltages at the output terminal of said integrator, the output of said voltage inverter and the output terminal of said amplifier which ar precisely 120° out-of-phase and precisely matched in amplitude.

3,889,207

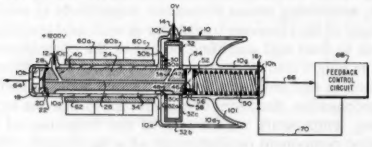
FREQUENCY STABILIZED GAS LASER

Glenn M. Burgwald, Mountain View; William P. Kruger, and Donald L. Hammond, both of Los Altos Hills, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Division of Ser. No. 13,285, Feb. 24, 1970, Pat. No. 3,771,066. This application May 7, 1973, Ser. No. 357,752

Int. Cl. H01s *3/10, 3/22*

U.S. Cl. 331—94.5 S **7 Claims**



1. A gas laser comprising:

means for enclosing a gas laser medium;

a rod of insulating material having a thermal coefficient of expansion in the range between +2 and −2 parts in 10^7 per degree centigrade and having a channel formed therein to define a gas discharge path in said gas laser medium, said channel having a pair of oppositely facing openings communicating with opposite ends of said rod;

a pair of electrodes supported in communication with opposite end portions of said channel and insulated from each other for operation at different potentials to excite said gas laser medium to produce a population inversion therein;

a pair of optical elements supported adjacent to the oppositely facing openings of said channel for at least partially reflecting said radiation produced by the population inverted medium in said channel to produce a coherent radiation beam;

a tuning element supported between one end of said rod and one of said optical elements for controlling the spacing between said optical elements, said tuning element having a length in the axial direction between said optical elements equal to less than ten percent of the spacing between said optical elements; and

means for energizing said tuning element.

3,889,208

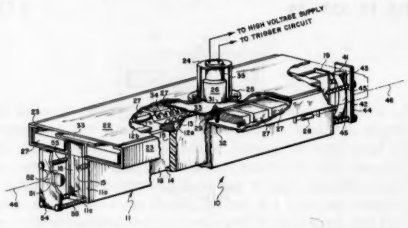
SUPERFLUORESCENT LASER WITH IMPROVED BEAM DIVERGENCE AND SPACIAL BRIGHTNESS

Irving Itzkan, Boston, Mass., assignor to Avco Everett Research Laboratory, Inc., Everett, Mass.

Filed Dec. 26, 1973, Ser. No. 427,441

Int. Cl. H01s *3/08*

U.S. Cl. 331—94.5 G **13 Claims**



1. In a pulsed superfluorescent laser device having short pulse output pulses of light energy, the combination comprising:

a. means defining an elongated unstable optically resonant cavity having a longitudinal axis and a predetermined length;

b. means for supplying to said cavity a gaseous lasing medium having at least two energy levels above the ground energy level in which the net excitation rate for the higher of the two upper levels is greater than the net excitation rate for the lower of the two energy levels by an amount sufficient to provide superfluorescence during electric discharge in said medium;

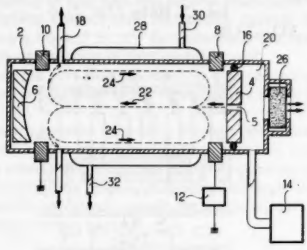
c. first and second oppositely disposed electrode means communicating with said cavity for applying an electric field across said cavity normal to and along said longitudinal axis; and

d. pulse circuit means coupled to said electrode means and adapted to be coupled to a pulsed source of high voltage electrical power for sequentially providing discrete pulses of said electric field in said cavity and sequentially providing discrete superfluorescent inversions between the said two energy levels of said gas, said inversions having a pulse width that is short compared to the transit time of light for several said cavity lengths.

3,889,209
GASEOUS FLUX LASER OSCILLATOR

Bernard Lavarini, Paris, France, assignor to Compagnie Generale d'Electricite, Paris, France

Filed Aug. 27, 1974, Ser. No. 501,108
Claims priority, application France, Sept. 6, 1973, 73.32156
Int. Cl. H01s *3/22*
U.S. Cl. 331—94.5 G **5 Claims**



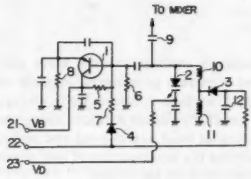
1. In a gaseous flux laser oscillator comprising:
an elongated enclosure suitable for containing a gas capable of being excited by an electrical discharge so as to produce a population inversion therein;
first and second electrodes arranged in the said enclosure and connected to a source of electric current so as to cause and maintain the said electrical discharge within the said gas;
first and second mirrors arranged in the vicinity of the first and second ends of the said enclosure respectively, so as to constitute an optical resonant cavity suitable for generating a laser oscillation within the said gas when it is excited by the said electrical discharge;
said first mirror being arranged inside said enclosure and drilled with a hole so as to enable a light beam resulting from the said laser oscillation to leave the said optical cavity therethrough;
said enclosure being provided at its first end with a transparent port enabling said light beam leaving the optical cavity to leave that enclosure also;
means for inserting and extracting said gas into and out of said enclosure, the improvement wherein:
the edges of the said mirror are connected together in a fluid-tight manner to the walls of said enclosure so as to constitute an insertion chamber within that enclosure and comprising said port; and
said insertion means comprises a source of said gas to supply gas to said insertion chamber under pressure, conduit means connecting the gas source and insertion chamber for admitting the gas to said optical cavity through said hole drilled in the first mirror, and for forming a swirling flow in the space subjected to the said electrical discharge.

3,889,210
LOCAL OSCILLATION CIRCUIT FOR REDUCING OSCILLATION VOLTAGE VARIATIONS BETWEEN HIGH AND LOW FREQUENCY BANDS

Shigeo Matsuura, Ayasemachi; Takeshi Saitoh, and Hiroshi Miyamoto, both of Yokohama, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Sept. 26, 1973, Ser. No. 400,923
Claims priority, application Japan, Sept. 29, 1972, 47-97073
Int. Cl. H03b *3/02, 5/12*
U.S. Cl. 331—109 **3 Claims**

1. A local oscillation circuit used in a tuner of a receiver whose reception frequency is variable, comprising
a resonance circuit including a variable capacitance diode to change the resonance frequency of the circuit and tuning coils for low and high frequency bands;
an oscillating transistor connected with said resonance circuit;
a first switching diode;
first biasing means for selectively supplying said first switching diode with a bias voltage to render said switching diode on and off alternatively according to said high and low bands of reception frequencies;
means for changing over said tuning coils of said resonance circuit according to the conduction and cut-off of said first switching diode;

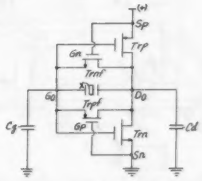


second biasing means for supplying said transistor with a bias voltage so as to start the oscillation operation of said transistor;
a second switching diode provided in said second biasing means and adapted to be rendered on and off alternatively according to the value of said bias voltage supplied from said first biasing means; and
means for changing the collector current of said transistor according to the conduction and cut-off of said second switching diode so as to increase the collector current during reception of a signal of said high frequency band.

3,889,211
MOS FIELD EFFECT TRANSISTOR CRYSTAL OSCILLATOR

Shinji Morozumi, Shimosuwa-machi, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed Aug. 28, 1973, Ser. No. 392,407
Claims priority, application Japan, Aug. 28, 1972, 47-85270
Int. Cl. H03b *5/36*
U.S. Cl. 331—116 R **6 Claims**

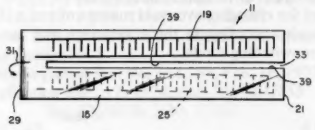


1. A quartz crystal oscillator circuit comprising a cascaded inverter circuit said cascade circuit including *n* complementary inverter stages connected in cascade, where *n* is an odd integer, and having an output terminal at the output of a last stage and an input terminal at the input of a first stage, a quartz crystal vibrator coupled between said last stage output and said first stage input to form a feed-back circuit therebetween, and biasing means in said feed-back circuit for setting the operating point of said oscillator circuit, said biasing means including two complementary parallel coupled integrated circuit field effect transistors, the source electrodes thereof being coupled to said input terminal and the drain electrodes thereof being coupled to said output terminal.

3,889,212
CIRCULATIVE SURFACE ACOUSTIC WAVE DEVICE

Joseph Burnsweig, and Steven H. Arneson, both of Los Angeles, Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed May 13, 1974, Ser. No. 470,110
Int. Cl. H03h *9/30, 9/26, 9/32*
U.S. Cl. 333—30 R **10 Claims**

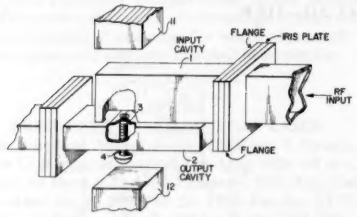


1. A circulative surface acoustic wave device, comprising:
an elongated substrate of material capable of supporting the propagation of surface acoustic wave energy, said substrate having two generally planar surfaces along the length thereof, and also having at least one curved end surface portion capable of supporting the propagation of said acoustic energy from one of said surfaces to the other;
at least one electro-acoustic transducer disposed on each of said planar surfaces, said transducers being oriented to direct and receive said surface acoustic wave energy along said planar surfaces from one to the other around said curved end surface portion of said substrate;
isolation means including a gap in said material extending at least between said transducers for attenuating both electrical and mechanical coupling between said transducers.

3,889,213
DOUBLE-CAVITY MICROWAVE FILTER

Carmine Vittoria, Bowie; Joseph Pasternak, and Howard Lessoff, both of Silver Spring, all of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 25, 1974, Ser. No. 464,024
Int. Cl. H01p *1/20, 7/06*
U.S. Cl. 333—73 W **11 Claims**

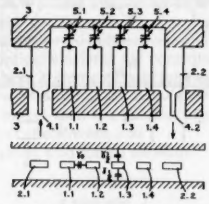


11. A magnetically tunable band-pass filter comprising:
a first microwave input portion for receiving microwave energy;
a second microwave output portion for transmitting microwave energy, said first and second portions being mounted adjacent to one another and connected by an opening therebetween;
a ferrimagnetic resonator positioned in said opening and comprising a substrate having opposed parallel surfaces with a ferrimagnetic material deposited uniformly over said opposed surfaces, said resonator being positioned such that one of said surfaces extends into said input portion and the other into the output portion; and
magnetic means for applying a variable magnitude magnetic field to said resonator.

3,889,214
PASS-BAND FILTER HAVING ELECTRONICALLY ADJUSTABLE MIDFREQUENCY

Christian H. Petitjean, Fontenay-aux-Roses; Maurice E. L. Marchand, Sevran, and Marcel Denis, Paris, all of France, assignors to International Standard Electric Corporation, New York, N.Y.

Filed May 6, 1974, Ser. No. 467,045
Claims priority, application France, May 18, 1975, 73.18092
Int. Cl. H01p *1/20, 7/10*
U.S. Cl. 333—73 R **4 Claims**

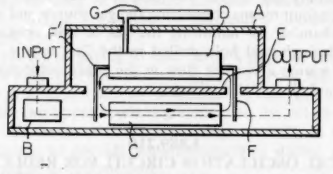


1. An improved midfrequency bandpass comb filter of the type having a casing consisting of a pair of opposing side walls, a plurality of parallel strips, and a number of first capacitors, each of said strips directly connected at one end to one of the side walls, and serially connected at the other end to the other of said side walls by means of each of said first capacitors wherein the improvement comprises:
a plurality of varactor diodes having first and second terminals, each of said varactor diodes in common connection with each of said first capacitors by means of said first terminals; and
a first source of variable bias voltage, each of said varactor diodes in common connection with said first bias voltage by means of said second terminals, whereby the midfrequency is displaced in response to variations in bias voltage causing variations in capacitance to occur therein said varactor diodes.

3,889,215
CIRCUIT BREAKER

Akira Yoshino, and Hitoshi Imanishi, both of Seto, Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Filed Apr. 3, 1974, Ser. No. 457,423
Claims priority, application Japan, Apr. 5, 1973, 48-38934; Apr. 6, 1973, 48-39932
Int. Cl. H01h *9/34*
U.S. Cl. 335—6 **4 Claims**



1. A circuit breaker comprising an input terminal part, a switching contact part electrically connected with said input terminal part, an excess current detecting part electrically connected with said switching contact part, an output terminal part electrically connected with said excess current detecting part, an operating part for operating said switching contact part in response to an electric output of said excess current detecting part, means for converting said electric output of the excess current detecting part into a mechanical motion to transmit said motion to said operating part, means for transmitting motions of the operating part to the switching contact

part, and a chassis made of an electrically insulative material for housing all said parts and elements,

said housing chassis comprising a main body having an intermediate partition wall defining on opposite sides thereof separated first and second chambers which are open in opposing directions with respect to said partition wall, said partition wall being provided with a pair of small apertures to permit communication between said first and second chambers, and lid members for closing the opening of said first and second chambers,

said switching contact part and excess current detecting part being housed in said first chamber and operatively fixed to one surface of said partition wall,

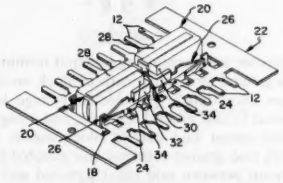
said operating part being housed in said second chamber and operatively fixed to the other surface of the partition wall,

said converting means extending through one of said pair of apertures in the partition wall to operatively couple the excess current detecting part with the operating part, and said transmitting means extending through the other aperture to operatively couple the operating part with the switching contact part.

3,889,216
ELECTROMAGNETIC RELAY ASSEMBLY

Kemper Martel Hammell, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 13, 1972, Ser. No. 306,114
Int. Cl. H01h *45/14*
U.S. Cl. 335—106 **4 Claims**



1. An electrically-driven mechanical device for switching an electrical current from one circuit to another, which comprises:

a. an insulating housing;

b. switching assemblies stamped from a single coplanar sheet of conductor material and formed to provide:

i. a plurality of posts spaced apart and formed into two parallel rows, each row depending downwardly from a side of the housing and adapted for insertion into a printed citcuit board receptacles for engagement with electrical circuits thereon,

ii. a pair of adjacent contact members each being an integral continuation of one of adjacent posts and projecting into said housing, the first member having a portion defining a first fixed contact and the second member having a lateral projection overlapping and spaced from the first fixed contact and defining a second fixed contact,

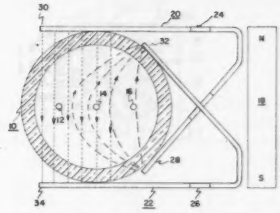
iii. a third contact member being an integral continuation of one of said posts positioned in the same row as the aforementioned pair of adjacent posts and projecting into the housing, said member having an elongated, laterally flexible arm with the free end thereof extending in between the first and second fixed contacts; and

c. electro-magnetic means for moving the flexible arm on the third contact member into electrical contact with either the first or second fixed contacts thereby switching an electrical current which may flow thru the third contact member from one to the other fixed contact member.

3,889,217
CONVERGENCE MEANS FOR INLINE-TYPE CATHODE RAY TUBE

Gary A. Martin, and John W. Lister, both of Portsmouth, Va., assignors to General Electric Company, Portsmouth, Va.

Continuation of Ser. No. 336,514, Feb. 28, 1973, abandoned. This application June 19, 1974, Ser. No. 480,715
Int. Cl. H01f *1/00*
U.S. Cl. 335—212 **19 Claims**



1. Static convergence means for use with a cathode ray tube having a plurality of electron beams disposed in a predetermined array and extending therein, comprising:

permanent magnetic means having at least a pair of poles;

a first plurality of pole piece means extending from said poles for supporting a first magnetic field which traverses the beam array in a first direction;

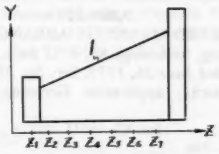
a second plurality of pole piece means extending from said poles for supporting a second magnetic field which traverses the beam array in a direction opposite said first direction;

said second magnetic field substantially offsetting the effect of said first magnetic field upon predetermined ones of the electron beams.

3,889,218
SADDLE SHAPED DEFLECTION COIL

Yoji Ishikawa, Saitama, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Aug. 6, 1974, Ser. No. 495,293
Int. Cl. H01f *5/00*
U.S. Cl. 335—213 **4 Claims**



1. A saddle type deflection coil for a cathode ray tube having cross-sections in planes perpendicular to a first axis corresponding to the longitudinal central axis of said cathode ray tube and each of which consists of a pair of half sectional portions substantially symmetrical with reference to a second axis lying in the respective plane and being perpendicular to said first axis, each of said half sectional portions of each cross-section including:

a. an outer curved margin defined by an arc of a circle with a center at a point on said first axis;

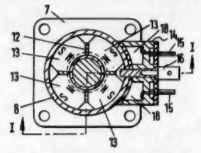
b. an inner margin having a curved part formed by an arc of another circle with a center at said point on said first axis and a straight part extending parallel with said second axis from said curved part; and

c. a pair of connecting margins between the adjacent ends of said outer and inner margins.

3,889,219
SOLENOID ACTUATOR WITH MAGNETIC LATCHING

Donald Alexander Larner, Kingston-upon-Thames, Surrey, England, assignor to Fluid Devices Limited, Kingston-upon-Thames, Surrey, England

Filed Nov. 1, 1973, Ser. No. 412,012
Claims priority, application United Kingdom, Nov. 2, 1972, 50624/72
Int. Cl. H01f 7/08
U.S. Cl. 335—234 9 Claims

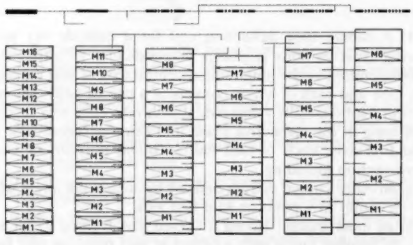


1. An electromagnetic actuator comprising:
an armature displaceable between first and second axially spaced positions;
a pair of spaced pole-pieces defining said first and second axial positions to which said armature is displaceable, each of said pair of spaced pole-pieces being disposed at one of said first and second axially spaced positions to limit the axial displacement of said armature, said armature and one of said pair of spaced pole-pieces forming a low reluctance magnetic path at each of said first and second axially spaced positions;
winding means for developing, when energized, lines of flux in said axial direction for displacing said armature between said first and second axially spaced positions; and
a plurality of permanent magnet means forming an annular array for latching said armature in said first and second axially spaced positions, each of said plurality of permanent magnet means being disposed in a plane which is transverse to said axial direction and exhibiting a magnetic polarity which is transverse to said axial direction, and each of said plurality of permanent magnet means being separated from an adjacent one of said plurality of permanent magnet means by a plane along said axial direction and extending radially outward therefrom.

3,889,220
STACKED MAGNETIC ARRANGEMENT

Heinrich Spodig, Netteberge 84, 4711 Bork, Germany

Filed June 26, 1973, Ser. No. 372,707
Claims priority, application Germany, July 3, 1972, 2232613
Int. Cl. H01f 7/02
U.S. Cl. 335—306 26 Claims

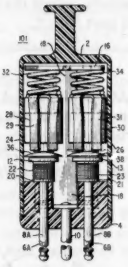


1. A magnet arrangement comprising, in combination, a stack of parts including at least two permanent magnet parts having respective first end faces of the same magnetic polarity and respective second end faces of the same magnetic polarity, said first end faces having a magnetic polarity opposite to the magnetic polarity of said second end faces, and an intermediate part made of a magnetic material having a magnetic permeability higher than the permeability of said permanent magnet parts and sandwiched between said permanent magnet parts and having a first end face juxtaposed with the first end face of one of said permanent magnet parts and an opposite second end face juxtaposed with the second end face of the other of said permanent magnet parts.

3,889,221
PROTECTOR UNIT

Robert Frederick Heisinger, Parsippany-Troy Hills Township, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 4, 1974, Ser. No. 447,587
Int. Cl. H01h 61/00
U.S. Cl. 337—15 7 Claims

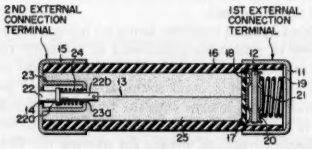


1. A protector unit comprising an input terminal, an output terminal, a ground terminal, a carbon block means for shunting voltages exceeding a preselected voltage level on said input terminal to said ground terminal, and a cage of conductive material about said carbon block means in electrical contact with said ground terminal and adapted for providing a current path between said input terminal and said ground terminal, said path normally being in an open condition, CHARACTERIZED IN THAT:
said unit includes a bimetallic disk in electrical contact with said input terminal and responsive to currents through said input terminal in excess of a preselected current level to deflect into engagement with said cage to close said path.

3,889,222
SURGE VOLTAGE ABSORBER

Ikuo Takano; Yasutaka Imajyo, and Akira Tanimoto, all of Tokyo, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Japan

Filed Nov. 7, 1973, Ser. No. 413,576
Int. Cl. H01h 85/30
U.S. Cl. 337—244 7 Claims



1. A surge voltage absorber which comprises a holding structure;
a first external connection terminal provided at one end of said holding structure;

a second external connection terminal having a penetrating hole and provided at the other end of said holding structure;

at least one nonlinear resistance element made of metal oxide and provided within said holding structure so as to be electrically connected to said first external connection terminal at its one end;

a first fusible element arranged so as to be electrically connected at its one end to the other end of said nonlinear resistance element;

a display member disposed in a recess of said second external terminal, connected to the other end of said fusible element and displaceable to the outside through said penetrating hole; and

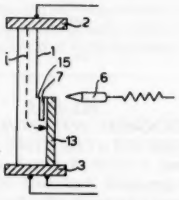
a biasing device which electrically contacts said second external connection terminal and said display member and causes said display member to project through said penetrating hole when said fusible element is melted away.

3,889,223

RESISTOR TRIMMING TECHNIQUE

Lino Sella, Banchette, and Claudio Dalmasso, Ivrea, both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Torino, Italy

Continuation of Ser. No. 310,729, Nov. 30, 1972, abandoned. This application Aug. 5, 1974, Ser. No. 494,660
Claims priority, application Italy, Dec. 2, 1971, 70956/71
Int. Cl. H01c *9/00*
U.S. Cl. 338—195 **5 Claims**



1. A resistor trimming arrangement comprising:

a resistor pattern having a first and second end with an initial resistance between these ends, said pattern including a first portion of relatively resistive material and a second portion of relatively conductive material so that an electrical current passing through said pattern from said first to said second end will pass through a first length of said resistive material and a second length of said conductive material;

electrically operable means for removing an amount of said resistive material; and

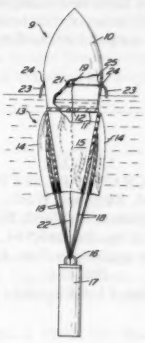
circuit means electrically connected to said removing means and electrically connected to the second end of the resistor pattern for operating said removing means to effect the removal of an amount of resistive material to increase the length of resistive material through which an electrical current passing between said ends passes to a length of said resistive material which is greater than said first length and to decrease the length of conductive material through which the electrical current passes to a length of said conductive material which is shorter than said second length, thereby causing the resistance between said ends to be increased.

3,889,224

CROWN FLOAT/DECELERATOR

Edgar A. Reed, Ambler, and E. Russell Combos, Churchville, both of Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 8, 1974, Ser. No. 449,295
Int. Cl. B63b *21/52*
U.S. Cl. 340—2 **6 Claims**



1. An entrapped air floatation device for deployment of a non-buoyant object from an elevated position in air into a body of water, comprising in combination:

an inflatable member formed to dependingly support the object and having an orifice positioned therein for restricting fluid flow out of said member, for allowing sufficient air into said member during descent from the elevated position to provide adequate buoyancy for the object, and for allowing water into said member thereafter, said orifice being positioned below the airwater interface after the device reaches a floating position in the water;

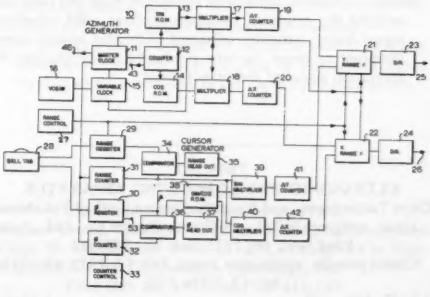
whereby the air pressure attained in said member is prevented from escaping through said orifice in high sea states by the water above said orifice.

3,889,225

SONAR DISPLAY

George J. McKenzie, Milton, Ontario, and Heinz W. Ruther, Mount Hope, Ontario, both of Canada, assignors to Westinghouse Canada Limited, Hamilton, Ontario, Canada

Filed Aug. 9, 1973, Ser. No. 386,881
Int. Cl. G01s *7/56, 7/62*
U.S. Cl. 340—3 C **2 Claims**



1. In a plan position information display system, a master clock source of pulses of a fixed frequency, a variable clock

source of pulses of a frequency adjustable in accordance with a variable ambient condition, a read only memory for producing a cyclically variable digital output function when driven by the count of the pulses from said master clock, a digital multiplier for multiplying the digital output from said read only memory with the digital value of the pulses produced by said variable clock and a digital to analogue converter which converts the digital output from said multiplier into an analogue value for deflecting the beam of a cathode ray tube in accordance with the digital output from said multiplier.

3,889,226

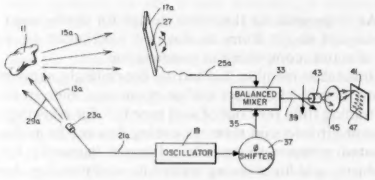
SCANNED HOLOGRAPHY BY SECTOR SCANNING

Bernard P. Hildebrand, Richland, Wash., assignor to Battelle Development Corporation, Richland, Wash.

Continuation-in-part of Ser. No. 166,944, July 28, 1971, Pat. No. 3,760,344. This application Sept. 12, 1973, Ser. No. 396,414

Int. Cl. G01s 9/66

U.S. Cl. 340—5 H **15 Claims**



1. A method of producing holographic information of an object scene, comprising the steps of:

illuminating the object scene with a coherent radiation beam that is generated by a substantially point radiation source fixed relative to the object,

positioning an extended radiation receiver of finite size in two dimensions relative to the object scene to detect radiation from said beam after modification by the object scene,

rotating said extended radiation receiver about a point fixed with respect to the object scene in a manner that the modified beam from the object scene is scanned over said extended radiation receiver, and

mixing a reference signal with the object modified radiation striking the extended radiation receiver, said reference signal being mutually coherent with said object scene illuminating beam, thereby producing a holographic information signal of the object scene.

3,889,227

ULTRASONIC WAVE RECEIVING APPARATUS

Kinya Takamizawa, and Kazuhiro Iinuma, both of Yokohama, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Japan

Filed Sept. 18, 1973, Ser. No. 398,314

Claims priority, application Japan, Feb. 13, 1973, 48-17114

Int. Cl. G01s 3/80

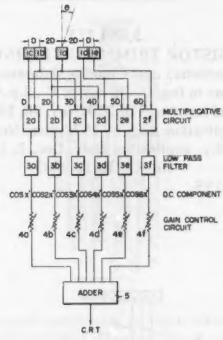
U.S. Cl. 340—6 R **5 Claims**

1. An ultrasonic wave receiving apparatus comprising:

an electroacoustic transducer array including a plurality of transducer elements arranged in the same plane so that any two adjacent transducer elements are spacially arranged at an integral multiple of a distance, said distance being determined from the equation $D/\lambda \sin \theta_1 = 1$ in which D represents said distance, λ the wave length of the receiving ultrasonic wave and θ_1 the spacial angle between a main lobe and a grating lobe adjacent to said main lobe, said distance also being selected so as to cause said grating lobe to be outside of a predetermined scanning range which limits the maximum incident angle of said ultrasonic wave into said plane, and said main lobe and grating lobe together with said spacial angle being factors for determining a receiving directionality pattern of said apparatus; and

signal processing means which includes a multiplicative circuit,

an extracting circuit for extracting the D.C. component of an output from said multiplicative circuit,



a gain control circuit for setting gains of the outputs from said transducer array, and

an adder, and

means for processing an output signal from each transducer element so as to cause the subject apparatus to indicate a receiving directionality pattern approximating a preset receiving directionality pattern; wherein the gain of said gain control circuit is set corresponding to the levels of the coefficients of the Fourier series into which said preset receiving directionality pattern is expanded as a function of the incident angle of the ultrasonic waves brought to said electroacoustic transducer array so as to approximate said receiving directionality patterns to said preset receiving directionality pattern, thereby sharpening said main lobe and reducing the levels of side lobes generating between said main lobe and grating lobe.

3,889,228

TWO-WAY ACOUSTIC TELEMETERING SYSTEM

Elbert N. Shawhan, West Chester, Pa., assignor to Sun Oil Co., Saint Davids, Pa. 19087

Filed Nov. 16, 1973, Ser. No. 416,467

Int. Cl. G01v 1/40

U.S. Cl. 340—18 FM **13 Claims**

1. In a system for transmitting acoustic signals in either direction along a string of drill pipe; a plurality of repeaters

distributed along said pipe, each repeater having means acoustically coupled to said pipe for receiving acoustic energy of a plurality of nominal frequencies therefrom; means acoustically coupled to said pipe for retransmitting acoustic energy of a plurality of nominal frequencies along said pipe; and means operating in dependence upon the nominal frequency of the energy received for selecting for

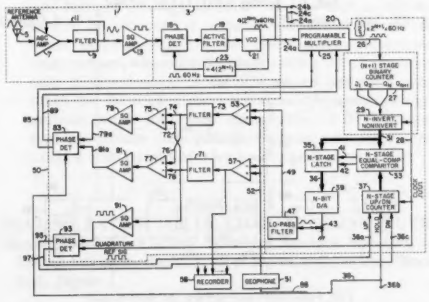
retransmission from said plurality of nominal frequencies a signal having a nominal frequency different from the nominal frequency received by the same repeater and different from the nominal frequency transmitted by a next repeater along said string in the direction of transmission to avoid interference between signals received at a repeater from adjacent repeaters above and below that same repeater.

3,889,229

SYSTEM FOR ELIMINATING MONOCHROMATIC SIGNALS FROM DATA RECORDS

Richard J. Kostelnicek; Curtis B. Herbert, both of Houston, Tex., and Thomas H. Crawford, Dhahran, Saudi Arabia, assignors to Exxon Production Research Company, Houston, Tex.

Filed Dec. 3, 1973, Ser. No. 421,384
Int. Cl. H03b *1/04;* **H04b** *15/04*
U.S. Cl. 340—15.5 CP **20 Claims**



1. Signal processing apparatus for eliminating a substantially monochromatic signal from an electrical signal that may include a data signal and said substantially monochromatic signal, said apparatus comprising:

first means for producing a substantially sinusoidal nulling signal having the same frequency as the substantially monochromatic signal;

second means for subtracting said nulling signal from said electrical signal thereby producing a residual signal;

circuit means for filtering the residual signal to eliminate signals having frequencies other than the frequency of the said substantially monochromatic signal thereby producing a filtered residual signal; and

third means responsive to the phase difference between the nulling signal and the substantially monochromatic signal to reduce the phase difference between the nulling signal and the substantially monochromatic signal and responsive to the phase of said filtered residual signal relative to a reference signal to reduce the amplitude of said residual signal.

3,889,230

CAPACITIVE TRANSDUCER AND METHOD OF USING THE SAME

Sydney T. Knott, Barnstable; Frederick R. Hess, Waquoit, and Richard T. Nowak, North Falmouth, all of Mass., assignors to Woods Hole Oceanographic Institution, Woods Hole, Mass.

Filed Sept. 2, 1966, Ser. No. 576,979
Int. Cl. G01v *1/38*
U.S. Cl. 340—17 **9 Claims**

1. A capacitive line transducer system including a line transducer and an amplifier, said line transducer having, in concentric formation,

an inner electrically conductive first member having a cylindrical surface area,

a uniform substantially compressible cellular dielectric layer entirely covering the first member,

an outer radially flexible electrically conductive third member over the dielectric layer and having a hollow cylindrical configuration and

an insulating layer surrounding the third member,

said amplifier being connected between said electrically conductive members and adapted to produce a signal varying with fluctuations in the capacity therebetween.

3,889,231

ELEVATOR SIGNALLING SYSTEM

Lawrence Tosato, Millburn; Leon A. Abel, Little Silver, and Clyde M. Mullis, Glen Rock, all of N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 26, 1973, Ser. No. 410,153
Int. Cl. B66b *3/02*
U.S. Cl. 340—21 **2 Claims**

1. An elevator system, comprising:

a structure having a plurality of floors and a hoistway,

an elevator car,

means mounting said elevator car for movement in said hoistway to serve at least certain of said floors,

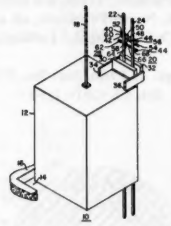
and control means for indicating when said elevator car is at a predetermined location in said hoistway, including elongated control element means disposed in said hoistway which extend in the direction of travel of said elevator car,

said elongated control element means including first and second spaced control elements,

first and second permanent magnets, a magnetically responsive switch, means mounting said first and second permanent magnets with like orientation on said elongated control elements means,

means mounting said magnetically responsive switch on said elevator car in predetermined spaced relation from said elongated control element means,

said means mounting the first and second permanent magnets including first and second universal mounting brackets, respectively, which are selectively connectable to said first and second control elements with a first orientation which places a predetermined surface of an attached permanent magnet in a first vertical plane, and with a second orientation which places the predetermined surface in a second vertical plane, spaced from and parallel to the first vertical plane, with said first and second universal mounting brackets being mounted on said first and second spaced control elements with like orientation,



said magnetically responsive switch being normally in a first condition and being actuated from the first condition to a second condition when subjected to a magnetic field, said first and second permanent magnets being spaced on said elongated control element means in the direction of travel of said elevator car such that when the magnetically responsive switch enters the magnetic field of either said first or second permanent magnet due to movement of said elevator car, the magnetically responsive switch will be actuated to its second condition and maintained in its second condition by the spaced first and second permanent magnets for a period of time which exceeds that possible due to magnetic coaction between only one of said permanent magnets and said magnetically responsive switch.

3,889,232

SENSOR ASSEMBLY FOR USE IN A VEHICLE EQUIPPED WITH A GAS BAG RESTRAINT SYSTEM

Lon E. Bell, Altadena, Calif., assignor to Technar Incorporated, Arcadia, Calif.

Continuation-in-part of Ser. No. 175,528, Aug. 27, 1971, abandoned. This application Aug. 13, 1973, Ser. No. 387,720

Int. Cl. G08b *19/00*

U.S. Cl. 340—52 H **13 Claims**

1. A crash sensor assembly disposed in a vehicle comprising:

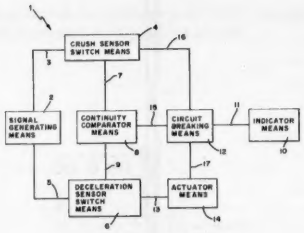
an electrical signal generating means;

a deceleration sensor switch means in electrical communication with said signal generating means;

a second sensor switch means in electrical communication with said signal generating means;

an actuating means, in electrical communication with said second sensor switch means and said deceleration sensor switch means, to activate a gas bag restraint system disposed in said vehicle upon closing of both said second and said deceleration switch means;

a continuity comparator means, in electrical communication with said second sensor switch means and said deceleration sensor switch means, the comparator means including means to electrically sense and generate an output signal when one of said switch means is closed for longer than a predetermined time interval before the other switch means closes; and



a circuit breaking means, disposed in electrical communication with said continuity comparator means responsive to said output signal for deactivating said crash sensor assembly upon receipt of said output signal sent to it by said continuity comparator means.

3,889,233

CHARACTER COINCIDENCE DETECTOR FOR OPTICAL INFORMATION RETRIEVAL SYSTEMS

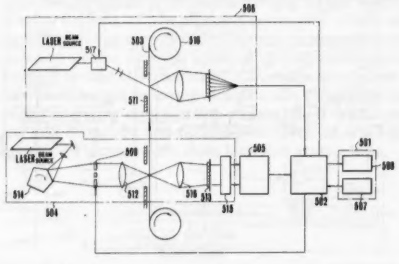
Haruo Ogiwara, Tokorozawa, Japan, assignor to Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan

Filed Aug. 29, 1973, Ser. No. 392,803

Claims priority, application Japan, Sept. 4, 1972, 47-89944

Int. Cl. G06g *9/00*; **G11c** *11/42*

U.S. Cl. 340—146.3 F **4 Claims**



1. A character coincidence detector for use in an optical information retrieval system for collating the coincidence between an information to be retrieved that has been stored as a hologram and an interrogation information which comprises an input-output unit, a central control device, a word

coincidence detecting circuit, and a readout unit, said character coincidence detector comprising:

a laser beam source generating a coherent light beam,

a rotary mirror receiving the coherent light beam emanated from said laser beam source for continuously deflecting the light beam in the horizontal direction;

an interrogation spatial light modulator for forming a desired interrogation information code pattern in response to a command from said central control device, said interrogation spatial light modulator receiving the deflected light beam and including a plurality of one-dimensional shutter arrays which are juxtaposed in a direction perpendicular to the horizontal deflection of said light beam, each one shutter of each shutter array being opened whereas the other shutters are closed so as to encode the interrogation information in response to the command from said central control device, and a plurality of cylindrical lens arrays disposed in front of said plurality of juxtaposed one-dimensional shutter arrays, each of said cylindrical lenses being disposed at the opening of each shutter;

a first convex lens for effecting a two-dimensional Fourier transformation;

a storage medium in the form of a hologram that has been recorded with an information to be retrieved by means of a recording spatial light modulator, said hologram storage medium being disposed behind said first convex lens, movable in the horizontal direction and scanned with the deflected light beam from said rotary mirror, said deflected light beam being spatially modulated by said interrogation spatial light modulator;

a second convex lens for effecting a two-dimensional Fourier transformation disposed on the back of said hologram storage medium;

an aperture plate for transmitting necessary light beams alone disposed on the back of said second convex lens and provided with a plurality of pin holes having a spacing corresponding to the distance between the centers of the shutters of the recording spatial light modulator;

a one-dimensional convex lens array, for focusing a correlation image from respective holograms of said hologram storage medium disposed corresponding to said pin holes of said aperture plate;

a plurality of photodiode arrays for photoelectrically detecting the correlation image;

a signal processing electronic circuit for receiving an electrical signal from respective elements of said plurality of photodiode arrays, said signal processing electronic circuit including at least one narrow bandpass filter, at least one threshold element (Schmitt trigger circuit) and a single AND gate connected to its output whereby when said hologram storage medium recorded with an information to be retrieved is scanned with the deflected light beam corresponding to the interrogation information code pattern, where a coincidence exists the photoelectrically detected signal of the reproduced hologram image takes the form of a narrow bandwidth signal having a definite center frequency independent of the interrogation information code pattern, but where no coincidence exists a zero output of a lowband signal is produced.

3,889,234

FEATURE EXTRACTOR OF CHARACTER AND FIGURE

Hiroshi Makihara, Kodaira; Toshihiro Hananoi, Matsudo, and Yoshiji Fujimoto, Hachioji, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 4, 1973, Ser. No. 403,391

Claims priority, application Japan, Oct. 6, 1972, 47-99805; Feb. 28, 1973, 48-23165; Apr. 9, 1973, 48-39457

Int. Cl. G06k *9/12*

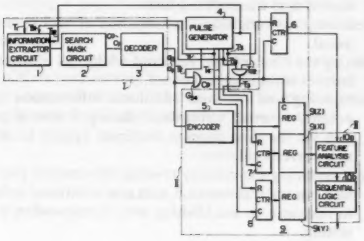
U.S. Cl. 340—146.3 MA **9 Claims**

1. A feature extractor of character and figure comprising:

first register means for storing a thinned, two-valued pattern of the character and figure;

information extractor means including n second register means for receiving from said first register means information along n consecutive predetermined scanning lines in said pattern of the character and figure, address signal generator means for generating address signals which address m positions in each of said predetermined scanning lines, and data selector means for receiving information from said second register means and said address signal generator means to simultaneously generate information of *n* by *m*, where n and m are integers;

search mask circuit means for searching coincidence of information extracted by said information extractor



means with patterns of search masks each having a predetermined pattern representative of the feature after comparison therewith;

counter means for counting the number of feature signals searched by said search mask circuit means to obtain the total number of the features;

third register means for storing signals representative of the variety of the signal searched by said search mask circuit means; and

fourth register means for storing signals representative of the coordinate on the character and figure of the feature signals searched by said search mask circuit means.

3,889,235

METHOD OF SAFEGUARDING THE TRANSMISSION OF THE CONTINUOUS POLARITY IN DATA TRANSMISSION SYSTEMS TRANSFERRING A POLARITY REVERSAL IN CODED FORM

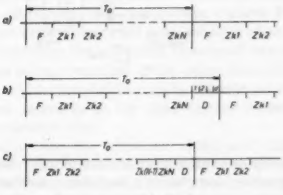
Ulf E. Assmus; Willy Bartel, and Horst Hessenmüller, all of Darmstadt, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Oct. 11, 1973, Ser. No. 404,628

Claims priority, application Germany, Oct. 11, 1972, 2249637

Int. Cl. H03k *13/34*; **H04b** *3/46*

U.S. Cl. 340—146.1 R **7 Claims**



1. In a telecommunication switching system normally transferring the polarity reversals occurring in asynchronous form

on sending terminals of k parallel transmitting lines via a time division multiplex system, the transmission being carried out in synchronous serial form to a receiving terminal in time frames, each of said time frames comprising a plurality of time slots, a method for safeguarding the correct transmission of a continuous polarity signal occurring on any of said k transmitting lines by additional cyclic interrogation of said transmitting lines and forming an additional information about the polarity on each of said k transmitting lines comprising the steps of:

transmitting said additional information formed concerning each said transmitting lines in the form of c 2 bits in at least one additional time slot (D) in one of said time frames within said time division multiplex system,

where c is the number of bits representing the polarity on one of said transmitting lines,

receiving said additional information at said receiving terminal,

testing the c bits of said received additional information for correct transmission thereof,

comparing said received additional information with said polarity reversal transmitted during a normal transmission via the time division multiplex system to determine non-correspondence,

and replacing the polarity reversal information provided by said normal transmission with said additional information in response to establishing non-correspondence by said testing.

3,889,236

INTERFACE SYSTEM WITH TWO CONNECTING LINES

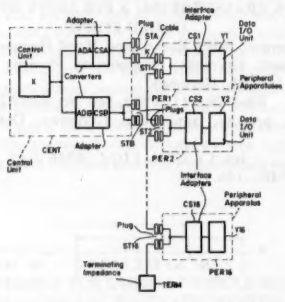
Horst Herger, and Helmut Hasso Schulz, both of Bremen, Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 9, 1973, Ser. No. 404,343

Claims priority, application Germany, Oct. 11, 1972, 2249725; Oct. 11, 1972, 2249737

Int. Cl. G06f *3/04*

U.S. Cl. 340—172.5 **7 Claims**



1. A serially-operating interface adapter for data input and output apparatus, comprising a modulator, a demodulator and a transport line via which blocks of information and clock signals can be transported, furthermore comprising a control unit which is connected to the transport conduit and which generates connect command signals and receives status signals, said transport conduit comprising a pair of lines consisting of a clock line and an information line, said modulator including means for generating bit pairs of signal elements having an even and an odd state, said pairs of signal elements being of alternating parity and being generated on a clock line and an information line respectively, said generating means being connected to clock inputs and information inputs activated under the control of a block start signal from said control unit, said generating means also being switchable between said states under the control of clock signals, said signal on the clock line corresponding to the inverted information signal in the case of odd parity and to the non-inverted information signal in the case of even parity means for halting, said switching under the control of a block stop signal, bits on different lines and occurring at the same time having the same parity being produced as frame signals, the demodulator which is connected to a clock line and an information line comprising a four-bit-parity detector for recovering block start signals and block stop signals.

3,889,237

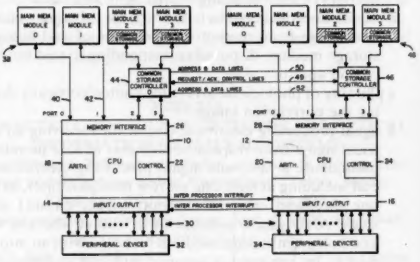
COMMON STORAGE CONTROLLER FOR DUAL PROCESSOR SYSTEM

Merwin H. Alferness, New Brighton, and John A. Miller, Roseville, both of Minn., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Nov. 16, 1973, Ser. No. 416,699

Int. Cl. G06f *15/16*

U.S. Cl. 340—172.5 **12 Claims**



1. A digital data processing system comprising in combination:

a. first and second central processor units;

b. first and second memory banks coupled to said first and second central processor units respectively, for storing information at addressable locations therein,

1. said first and second memory banks each having substantially identical cycle times and a predetermined range of addresses therein set aside for storing identical information;

c. first and second controller means connected intermediate said first central processor unit and said first memory bank and said second central processor unit and said second memory bank, respectively, said first controller means including,

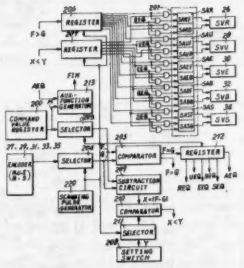
1. means for detecting when said first central processor unit is writing new information into said first memory bank at an address within said predetermined range of addresses, and

2. means responsive to said detecting means for transferring said new information and said address to said second controller means for causing the same new information to be stored at said address in said range of addresses in said second memory bank.

3,889,238
CONTROL DEVICE FOR MULTI-AXIS SERVO-ACTUATORS

Itaru Sakurai, Nagoya, Japan, assignor to Toyoda-Koki Kabushiki Kaisha, Aichi-ken, Japan

Filed Feb. 27, 1974, Ser. No. 446,409
Claims priority, application Japan, Feb. 28, 1973, 48-24597
Int. Cl. G06f *15/46;* **B25j** *9/00*
U.S. Cl. 340—172.5 **8 Claims**



1. Control device for multi-axis servo-actuators serving to control a position and a posture of a controlled object having a plurality of degrees of freedom in a three-dimensional space, comprising:

command value register means for setting a plurality of command values for respective axes;

present position detecting means for detecting the present position of each of said servo-actuators and for generating present values for said respective axes in response to said present positions;

a first selector connected to said command value register and serving to sequentially select and output of said command values in accordance with scanning signals;

a second selector connected to said present position detecting means and serving to sequentially select and output one of said present values in accordance with said scanning signals;

scanning signal generating means for generating said scanning signals;

a first comparator connected to said first and second selectors and serving to sequentially compare said present value with said command value for each axis and for generating a first control signal and a second control signal, said first control signal representing an inequality between said command value and said present value, and said second signal indicating a coincidence between said command value and said present value;

a second comparator serving to generate a third signal when the difference between said command value and said present value becomes smaller than a predetermined setting value;

first register means serving to generate an actuation and direction indication signal for each axis in response to said first and third signals supplied from said first and second comparators in accordance with said scanning signals out of said scanning signal generating means;

second register means serving to memorize said coincidence signal for each exis in response to said second signal supplied from said first comparator in accordance with said scanning signals supplied thereto and to generate an actuation stop signal for each axis based upon said coincidence signal, said actuation and direction indicating signal and said actuation stop signal being switching or on-off signals.

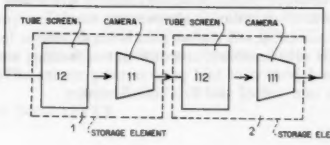
a plurality of servo-amplifiers provided for said respective axes and connected to said first and second register means so as to be supplied with said actuation and direction signal and said actuation stop signal, and respectively generating a predetermined output in response to said actuation and direction signal and said actuation stop signal; and,

a plurality of servo-valves connected to said servo-amplifiers and serving to control the actuations of said servo-actuators in accordance with said predetermined output out of said servo-amplifier for each axis.

3,889,239
SELECTIVE STORAGE SYSTEMS

Johannes Jacobus Gillissen, Leimuiden, Netherlands, assignor to Societe Honeywell Bull (Societe Anonyme), Paris, France

Filed Feb. 13, 1973, Ser. No. 331,742
Claims priority, application France, Feb. 16, 1972, 05210/72
Int. Cl. G11c *11/32, 21/00;* **H04n** *5/80*
U.S. Cl. 340—172.5 **5 Claims**



1. In a data storage system, the combination of:

at least a pair of data storage assemblies forming a data storage loop, each assembly including a data storage member inherently possessing only a limited storage time capability and having a face at which an array of stored data is displayed, and a television camera focussed on said face optically to read selected data of said array;

means connecting the television camera of one assembly to the data storage member of the other assembly for transferring said selected data read by the television camera of said one assembly to the data storage member of said other assembly; and

means connecting the television camera of said other assembly to the data storage member of said one assembly for transferring said selected data back to said data storage member of said one assembly whereby periodically to re-store data in said data storage member of said one assembly within said limited storage time capability thereof.

3,889,240

SYSTEM FOR PROGRAMMING THE STARTING AND STOPPAGE OF APPARATUS FOR THE PRODUCTION AND/OR PROCESSING OF CIGARETTES OR THE LIKE

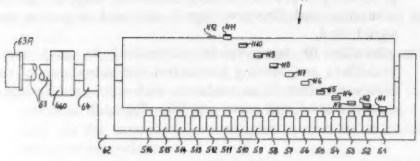
Joachim Buchegger, Hamburg, Germany, assignor to Hauni-Werke Körber & Co. KG, Hamburg, Germany

Filed Apr. 28, 1972, Ser. No. 248,674

Claims priority, application Germany, Apr. 29, 1971, 2121044; Dec. 11, 1971, 2161611

Int. Cl. G06f *9/00*; **A24b** *7/14*; **A24c** *5/34*

U.S. Cl. 340—172.5 **22 Claims**



1. In an apparatus for the production and/or processing of cigarettes or analogous rod-shaped articles which constitute or form part of smokers' products, a combination comprising a plurality of article producing and processing first subassemblies arranged to operate in synchronism with each other; a plurality of second subassemblies arranged to be activated and/or deactivated in a predetermined sequence during starting and/or stoppage of the apparatus; a plurality of signal generating operating means each operatively connected with at least one of said second assemblies and actuatable to thereby activate and/or deactivate the respective second subassemblies; programming means at least a portion of which is movable between plural positions, said programming means being operable to actuate said operating means in a predetermined sequence; prime mover means for driving at least one of said first subassemblies; and motion transmitting means for moving said portion of said programming means in synchronism with said one of said first subassemblies.

3,889,241

SHIFT REGISTER BUFFER APPARATUS

Vincent A. Cordi, Vestal, and Chester S. Gurski, Endwell, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 2, 1973, Ser. No. 329,272

Int. Cl. G06f *7/22*, *15/40*; **G11c** *19/00*

U.S. Cl. 340—172.5 **10 Claims**

1. Buffer apparatus adapted for connection to sources of read and write requests and to input means supplying variable length record data, said apparatus comprising

a shift register store having an input and an output and adapted to be initialized with a unique code entry and blank code entries stored therein,

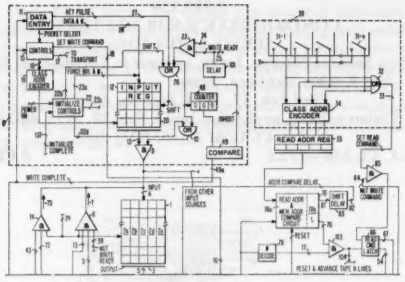
means forming a first path from the output to the input normally effective for recirculating entries in the store,

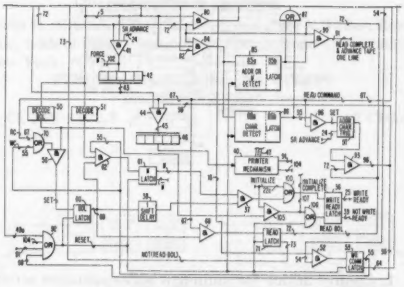
means forming a second path from the output to the input and including storage means for extending the effective length of the store,

means for detecting the unique code entry,

means for detecting the first blank code entry following the unique code entry,

means controlled by the unique code entry detecting means and the blank code entry detecting means when a write request occurs for storing input record data entries into the store starting at the position of said first blank entry and including means for rendering said first path ineffective during said storing, and





means controlled by the unique code entry detecting means when read requests occur for rendering the second path effective and the first path ineffective to insert blank code entries into the store preceding the unique code and for rendering the first path effective and the second path ineffective to remove data entries, equal in number to the inserted blank code entries, from the store in a sequence related to the order in which the record data was stored, whereby record data entries are maintained in the store immediately following the unique code entry and free of blank code entries therebetween.

3,889,242

MODIFIABLE COMPUTER FUNCTION DECODER

Michael M. Malmer, Jr., Livonia, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Continuation of Ser. No. 186,275, Oct. 4, 1971, abandoned. This application Aug. 29, 1973, Ser. No. 392,510

Int. Cl. G06f *1/00*

U.S. Cl. 340—172.5 **5 Claims**

1. In a digital computer having a relatively large set of microinstructions and a relatively smaller set of N-function codes, many of said microinstructions requiring one of said set of N-function codes for its implementation, a modifiable function decoder comprising:

a fixed-length microinstruction storage register having a first register section of *n* storage locations quasi-dedicated to the storage of function code and a second register section of *m* storage locations;

means coupled to said second register section and responsive to particular combinations of signals stored in one or

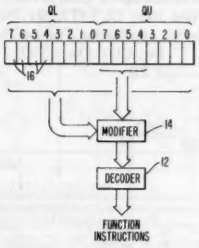
more of said *m* storage locations for identifying a particular microinstruction requiring a particular function code, said identified particular microinstruction being structured such that said required particular function code cannot be stored in said *n* quasi-dedicated storage locations, and for generating one or more modifier signals in response thereto;

modifier means including:

first input means coupled to said first register section for receiving signals from said *n* storage locations;

second input means coupled to said means for generating modifier signals; and

logic means coupled to said first and second input means, said logic means responsive to one or more of said



modifier signals for altering the signals stored in said *n* storage locations to force the generation of said particular function code required for the implementation of said identified particular microinstruction and responsive to the absence of one or more of said modifier signals for allowing the unaltered contents of said *n* storage locations to operate as an unmodified function code; and

decoder means coupled to said logic means of said modifier means for decoding said modified and unmodified function codes as if said *n* storage locations of the first section of said microinstruction register had been initially dedicated solely to the storage of said required set of N-function codes.

3,889,243

STACK MECHANISM FOR A DATA PROCESSOR

Edward G. Drimak, Johnson City, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 18, 1973, Ser. No. 407,688

Int. Cl. G06f *13/00*

U.S. Cl. 340—172.5 **5 Claims**

1. In a data processing system, the combination comprising a stack having a plurality of addressable entry registers having sequential addresses between a predetermined low and high values,

means including a first pointer register for storing entries of a first type in the entry registers in ascending address order from said low value,

means including a second pointer register for storing entries of a second type in the entry registers in descending address order from said high value,

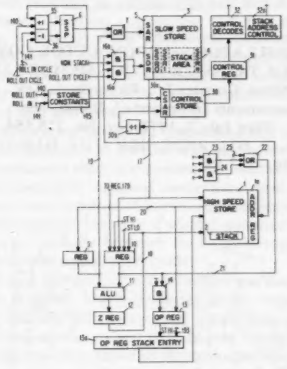
means for removing the entries of each type from the stack for processing in a last-in-first-out order,

a store slower in speed than the stack for storing overflow entries from the stack when the latter is full,

means responsive to the pointer values during the storing of an entry on the stack when the values of the pointers bear a predetermined numeric relationship indicative of a full stack condition for rolling out stack entries and the current first and second pointer values to the slower speed store,

means initializing the pointers to said predetermined low and high values after each roll out,

means responsive to the pointer values during the attempted removal of an entry from the stack, when the value of one of the pointers indicates that there is no corresponding entry on the stack, for rolling in needed entries and the



pointer values from the store to the stack and pointer registers respectively,

means for reserving a directly addressable area in the stack for storing one of the last mentioned types of entries,

means for directly addressing any one of a plurality of entry registers in said reserved area when the respective pointer value points to the top of said reserved area.

3,889,244

GRAPHIC DATA DISPLAY SYSTEM WITH MULTIPLE DISPLAY INHIBIT DELAY TIMES

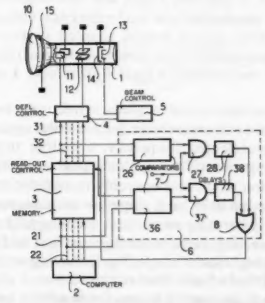
Dusan Sinobad, Paris, France, assignor to Compagnie Industrielle des Telecommunications Cit-Alcatel, France

Filed Sept. 21, 1973, Ser. No. 399,477

Claims priority, application France, Sept. 21, 1972, 72.33399

Int. Cl. G11c *11/26, 7/06*

U.S. Cl. 340—173 CR **7 Claims**



1. A graphic data display system for effecting controlled traces on the screen of a cathode ray tube, comprising a memory capable of storing a sequence of data signals in binary form representing at least one data item relating to a portion of a tracing to be effected, control means connected to said memory for controlling the electron beam of the cathode ray tube on the basis of said data signals in binary form received

from said memory and capable of affecting the beam for the displaying of the corresponding trace, detection means connected to the input and the output of said memory means for detecting the extent of changes in said data signals, and inhibiting means connected to said memory for inhibiting the application of data signals to said control means for selected delay periods in response to the output of said detection means representing different ranges of change in said data signals.

3,889,245

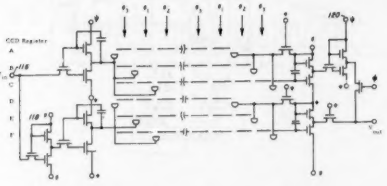
METAL-INSULATOR-SEMICONDUCTOR COMPATIBLE CHARGE TRANSFER DEVICE MEMORY SYSTEM

William Milton Gosney, Jr., Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed July 2, 1973, Ser. No. 375,554

Int. Cl. G11c *19/00*; **H01l** *11/14*; **G11c** *21/00*

U.S. Cl. 340—173 RC **18 Claims**



1. A charge transfer device digital data processing system comprising in combination on a semiconductor chip:

charge transfer device shift register means having an output diode for entering data therein and an output diode charge sink;

first clock pulse operable insulated gate field-effect transistor ratioless inverter circuit means selectively connected to said input diode for operating said input diode to enter charge into said shift register responsive to voltages corresponding to digital logic input signal levels;

second clock pulse operable insulated gate field-effect transistor ratioless inverter circuit means connected to said output diode, said second inverter circuit means including a first insulated gate field-effect transistor means for precharging said output diode to a reference potential, said output diode responsive to absence of charge corresponding to a logic **0** in the last bit of said shift register to discharge to a second voltage level, said output diode further responsive to presence of charge corresponding to a logic **1** in the last bit of the shift register to remain charged substantially at said reference voltage, said second inverter circuit means adapted to respond to said discharged and charged conditions of said output diode to produce respectively a logic **0** or a logic **1** output signal level.

9. In a digital data metal insulator semiconductor processing system operable in responsive to a master synchronization clock of a preselected frequency, a charge transfer device memory configuration having a data rate equal to said master synchronization clock and operably responsive thereto, comprising in combination on a single semiconductor chip;

first clock generating means for receiving said master clock and generating, responsive thereto, first and second non-overlapping clocks respectively having a frequency of one-half that of said master clock;

second clock generating means for receiving said first clock and generating, responsive thereto, an *n*-phase overlapping clock system suitable for controlling charge transfer device shift registers, each phase thereof having a frequency of $1/2n$ the frequency of said master clock, wherein *n* is an integer; and

a plurality of parallel charge transfer device shift register units on said chip, each shift register unit having first and second sets of parallel shift registers of n shift registers each, each shift register unit having ratioless dynamic input means on said chip for multiplexing input data onto said first and second sets of shift registers, and output ratioless dynamic detector means on said chip for sequentially detecting the charge at the output of each shift register of said first and second sets of said shift register unit and demultiplexing said data to provide a voltage corresponding to the binary logic level of detected charge, whereby the effective clock rate of said shift register unit is the same as the clock rate of said master clock.

3,889,246

PROPAGATION REGISTER FOR MAGNETIC DOMAINS

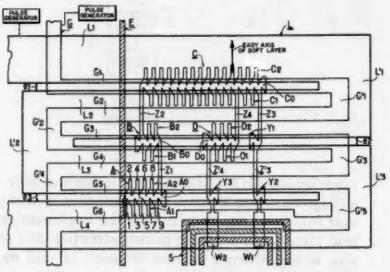
Claude Battarel, Magagnosc, France, assignor to Techniques et Systemes Informatiques, Courbevoie, France

Filed June 22, 1973, Ser. No. 372,866

Claims priority, application France, June 6, 1972, 72.22962

Int. Cl. G11c *19/00*, *11/14*

U.S. Cl. 340—174 ZB **10 Claims**



1. In a propagation register device including at least one register for magnetic domains in a soft zone formed by a magnetic layer of low coercivity and uniaxial anisotropy perpendicularly to the propagation direction and surrounded by hard zones having a greater coercivity; the improvement comprising: for each register, a plurality of advance components in alignment with the propagation direction, each component having a central soft zone and a first and second lateral soft zone with inclined edges between the central and the lateral zones such that a domain which passes from the first lateral zone to the second is slightly deviated perpendicularly to the easy magnetic axis at an edge and that the domain when returning to the central zone is again deviated in the same direction and enters into the first lateral zone of an adjacent advance component, a first sinous lateral conductor, having at least two parallel turns, including a first turn covering a plurality of the said first lateral zones and a second turn covering the corresponding second lateral zones, and a second sinous central conductor having a first turn which covers approximatively the interspace between the two turns of the lateral conductor in which are located the central zones of the advance components.

3,889,247

DEVICE FOR DETECTING THE PRESENCE OF LIQUIDS

Walter Voll, 8728 Hassfurt, Germany

Filed Dec. 17, 1973, Ser. No. 425,656

Claims priority, application Germany, Dec. 21, 1972, 2262559

Int. Cl. G08b *21/00*

U.S. Cl. 340—244 C **9 Claims**

1. A detector device for detecting the presence of liquids, the device comprising in combination:

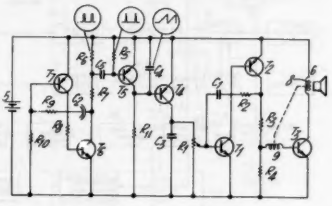
a housing;

electro-acoustic transducer means supported in said housing;

at least two mutually spaced electrodes supported on an exterior surface portion of said housing to be exposed to contact by liquid to be detected;

electrical circuit means including said electrodes and responsive to a change in impedence therebetween to generate a signal condition;

electrical generator means in said housing and electrically connected to said circuit means to generate an electrical signal to operate said transducer in response to said signal condition, said generator means comprising a first pulse generator connected to said electrical circuit means, a



second pulse generator, and a blocking oscillator having input means connected to output means of said second pulse generator, said first pulse generator generating a train of pulses of which the pulse repetition frequency is responsive to said signal condition, said pulse train being applied to input means of said second pulse generator to cause the latter to generate an electrical pulse to trigger said blocking oscillator and thereby to provide said electrical signal to operate said transducer when and only when said pulse repetition frequency is less than a predetermined value; whereby said transducer provides an audible indication of the presence of such liquid at said electrodes.

3,889,248

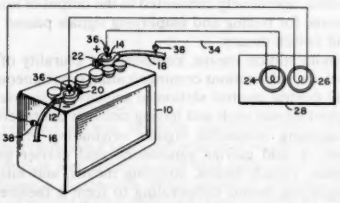
FAULTY BATTERY CONNECTION INDICATOR

Herbert W. Ritter, Alamo, Calif., assignor to Esther Ritter, Santa Clara, Calif.

Continuation of Ser. No. 6,442, Jan. 28, 1970, abandoned. This application May 21, 1973, Ser. No. 361,864

Int. Cl. G08b *21/00*

U.S. Cl. 340—249 **4 Claims**



1. The combination comprising:

an automobile-type wet cell battery having first and second terminal posts;

first and second insulated cables, one for each of said first and second posts, respectively;

first and second clamps, said first clamp being electrically connected to said first cable and being clamped to said first post, said second clamp being electrically connected to said second cable and being clamped to said second post, whereby first and second normally low impedance electrical connections between said first cable and said first post, and between said second cable and said second post are completed;

first and second two-terminal indicators, one for each of said first and second low impedance electrical connections, respectively, for indicating the condition of each of said first and second normally low impedance electrical connections;

first connecting means for connecting said first two-terminal indicator in parallel with said first normally low impedance electrical connection, said first means comprising a first electrical connection connected directly between one terminal of said first indicator and said first terminal post, and a second electrical connector connected directly between the other terminal of said indicator and said first cable;

second connecting means for connecting said second two-terminal indicator in parallel with said second normally low impedance electrical connection, said second means comprising a first electrical connector connected directly between one terminal of said second indicator and said second terminal post and a second electrical connector connected directly between the other terminal of said indicator and said second cable;

whereby said first and second indicators are short-circuited by the normally low impedances of the respective normally low impedance electrical connection, said indicators being in the current path of said battery when the normally low impedance of the respective electrical connections increase, the change of state of said indicator due to current flow therethrough indicating said increase in impedance.

3,889,249

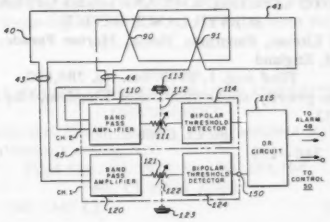
STATIC MAGNETIC FIELD METAL DETECTOR

Clarence L. Bennett, Jr., Groton; Joseph D. De Lorenzo, Sudbury, and Hubert P. Durling, Jr., Lancaster, all of Mass., assignors to Sperry Rand Corporation, New York, N.Y.

Division of Ser. No. 193,846, Oct. 29, 1971. This application Apr. 23, 1973, Ser. No. 353,853

Int. Cl. G08b *21/00*

U.S. Cl. 340—258 R **16 Claims**



1. Apparatus for detecting relative motion of a metal object comprising:

means for generating a substantially uniform unidirectional magnetic field,

multiple conductor magnetic field pick up coil means disposed in stationary relation in said unidirectional magnetic field and having output conductor means,

said coil means having first and second sections symmetrically located about a mid-plane of said coil means,

cross over conductor means for connecting opposite conductors of said first and second sections at said mid-plane for providing detection signal on said output conductor means in the presence of said object adjacent said first or said second sections while affording substantial cancellation of spurious magnetic field responses,

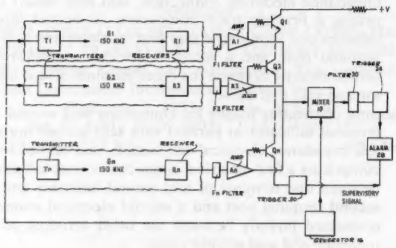
threshold detector means coupled to said output conductor means, and

utilization means responsive to said threshold means.

3,889,250
ACTIVE FREQUENCY-RESPONSIVE GLASS BREAKAGE DETECTOR

Elias E. Solomon, Duxbury, Mass., assignor to Gulf & Western Manufacturing Company, New York, N.Y.

Filed Oct. 15, 1973, Ser. No. 406,490
Int. Cl. G08b *13/04*
U.S. Cl. 340—274 18 Claims

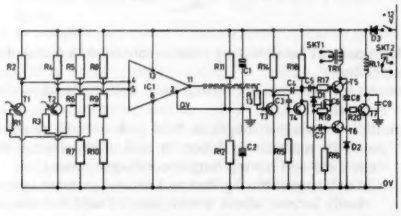


1. A system for detecting breakage of a solid material, said system comprising;
   a transmitter transducer disposed at one area of said material for establishing a signal of first frequency,
   said material creating a signal of second frequency when broken,
   a receiver transducer disposed at another area of said material for receiving a control signal which is said first frequency signal when no breakage occurs and a composite of the first and second frequency signals when breakage occurs,
   means for mixing said control signal with said first frequency signal to provide at least a third frequency signal when breakage occurs,
   and means for indicating an alarm condition upon detection of said third frequency signal.

3,889,251
PHOTO ELECTRIC AMBIANT LIGHT OPERATED SURVEILLANCE DEVICE

Mitchel Litman, Panorama House, Marine Parade, Canvey Island, England

Filed Aug. 1, 1973, Ser. No. 384,600
Claims priority, application United Kingdom, May 8, 1972, 21435/72
Int. Cl. G08b *21/00*
U.S. Cl. 340—279 6 Claims

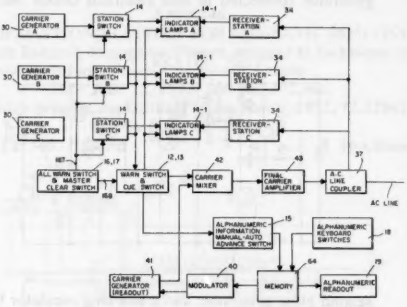


1. A surveillance device comprising two photosensitive devices arranged to receive ambient light reflected respectively from an eye of the person under survey and from an area of skin adjacent to the eye, means for comparing signals generated by the photo-sensitive devices, and a device providing an alarm when the signals generated by the photo-sensitive devices are equal.

3,889,252
METHOD AND SYSTEM FOR TRANSMITTING SIGNALS IN THEATRES

Charles H. Cox, III, Arlington, Mass., and Albin M. Aukerlund, Philadelphia, Pa., assignors to Charles H. Cox, III, Arlington, Mass.

Filed Oct. 25, 1972, Ser. No. 300,664
Int. Cl. H04b *3/00*
U.S. Cl. 340—313 6 Claims

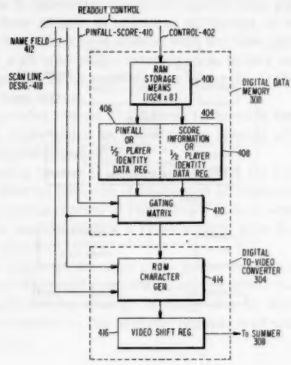


1. A system for simultaneous communication between a central control station in a theatre and a plurality of remote stations, such theatre having installed therein a medium which links said central control station and said plurality of remote stations, comprising:
   a. carrier generator means in said central control station, having a plurality of carrier generators each producing an output signal of a different respective frequency, and each corresponding to one of said plurality of remote stations;
   b. switch means in said central control station, adapted to be placed in different states, for passing said output signals when in a first state and blocking said output signals when in a second state;
   c. selective coupling means in said central control station, having a plurality of station switches each corresponding to a respective one of said carrier generators, for simultaneously switchably coupling selected output signals of said carrier generators to said switch means;
   d. mixing and amplifying means in said central control station, operatively connected to the output of said switch means, for mixing and amplifying signals passed through said switch means;
   e. remote station means, comprising a plurality of remote stations, said stations communicating simultaneously with said central control station in selective response to said output signals each unit having circuitry for receiving and processing respective signals originating in respective ones of said carrier generators; said carrier generator means, switch means, coupling means, and mixing and amplifying means cooperating to form a theatre central control means, said central control means producing theatre operation signals individually to communicate with corresponding individual remote stations in any desired relative time sequences;
   f. transmission means, comprising said medium for coupling signals from said mixing and amplifying means to said plurality of remote stations; and
   g. each such remote station having means for processing the received signals, and indicator means for indicating the state of the system as represented in the information carried on the processed signals.

3,889,253
RASTER-SCAN DISPLAY SYSTEM HAVING IMPROVED MEANS FOR READING OUT STORED GAME-SCORE INFORMATION

Walter Lee Ross, Simi, Calif., assignor to RCA Corporation, New York, N.Y.

Filed June 22, 1973, Ser. No. 372,645
Int. Cl. G06f *3/14*
U.S. Cl. 340—323 **6 Claims**



1. In a raster-scan display system incorporating storage means, and readout means coupled to said storage means for use in electronically displaying stored game-score data of a given kind of game in a standardized format on a video-signal display device while the game is progressing, said format including an individual strip region thereof devoted to any given player with a first predetermined portion of said strip region having displayed therein a single line of characters identifying said given player and with a second predetermined portion of said strip region having displayed therein k lines of characters defining score information of said given player, k being a first plural integer, wherein a binary word having at least n bits is required to uniquely distinguish each character of a given alphabet of player-identifying characters, n being a second plural integer, and wherein the number of bits m_i of a binary word required to uniquely distinguish each character of a preselected alphabet for the ith respective ordinal one of said k lines of score-information is sufficiently smaller than n so that

$$n \geq \sum_{i=1}^{i=k} m_i ;$$

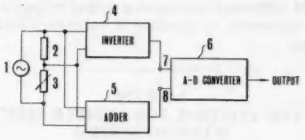
the improvement wherein:

said readout means includes digital-to-video converter means responsive to digital addresses sequentially applied thereto in synchronism with said raster-scan display for defining a raster-scan video signal of characters manifested by said digital addresses; time generating means for synchronizing said raster-scan display; first means for reading out from said storage means successive binary words each having the same given number of bits, said given number being at least as large as n; second means coupled to said first means and said time generating means and responsive to each readout binary word while said first portion of a strip region is being scanned for digitally addressing said digital-to-video converter with a single n-bit binary word to thereby provide the raster-scan display of said single line of characters identifying said given player, said second means being further responsive to each readout binary word while said second portion of a strip region is being scanned for dividing said readout binary word into k separate m_i-bit binary words, each ordinal one of which corresponds to a character of a different ordinal one of said k lines of score-information, and digitally addressing said digital-to-video converter in sequence with each ordinal one of said separate m_i-bit binary words to thereby provide the display of all of said k score-information lines of said given player.

3,889,254
MEASURING APPARATUS

Goro Kobayashi, Oisomachi, Japan, assignor to Oki Electric Industry Co., Ltd. and Japan Society for the Promotion of Machine Industry, both of Minato-ku, Tokyo, Japan

Filed July 20, 1973, Ser. No. 381,236
Claims priority, application Japan, July 24, 1972, 47-73456; Dec. 28, 1972, 47-130209
Int. Cl. H03k *13/02*
U.S. Cl. 340—347 NT **7 Claims**

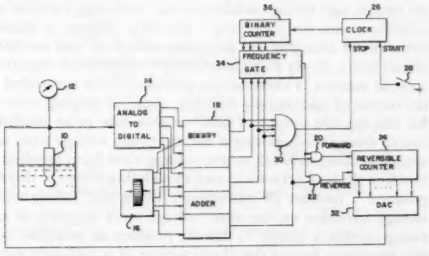


1. In a measuring system in which a digital output representative of a measured analogue quantity is provided by using an analogue voltage responsive circuit and an analogue-digital converter, the improvement wherein said responsive circuit comprises a source of voltage, a fixed impedance, a variable impedance which varies its impedance in accordance with a measured quantity, said fixed and variable impedances being connected in series across said source; means to apply the terminal voltage across said fixed impedance to said analogue-digital converter to act as the internal reference voltage of said analogue-digital converter; and means to apply the sum of the terminal voltages across said fixed and variable impedances to said analogue-digital converter to act an an input thereto.

3,889,255
DIGITAL CALIBRATION SYSTEM FOR AN ELECTRONIC INSTRUMENT

Aage Pettersen, North Reading, Mass., assignor to Corning Glass Works, Corning, N.Y.

Filed Mar. 22, 1974, Ser. No. 453,794
Int. Cl. H03k *13/02*
U.S. Cl. 340—347 CC **4 Claims**



1. An automatic calibration system for an electronic instrument which produces a measurement votlage and which produces a calibrating voltage in response to a standard during a calibration mode of operation comprising:

means for converting said calibrating voltage to a binary coded digital signal,

manually settable switch means producing a binary coded digital signal representing the magnitude of said standard, a binary adder, the binary coded digital signals from said means for converting and from said manually settable switch means being applied to said binary adder, said binary adder producing a multiple bit digital output representing the difference between the applied digital signals,

a digital counter,

a source of clock pulses,

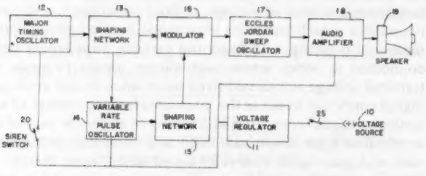
gating means, said multiple bit digital output being connected to said gating means, said clock pulses being applied through said gating means to said counter, said gating means being connected to stop the application of pulses to said counter when said difference is zero so that said counter counts a number of pulses related to said difference, and

a digital-to-analog converter responsive to the outputs of said counter to produce an analog output voltage related to said difference, said analog output voltage controlling said instrument to produce a calibrated measurement voltage.

3,889,256
AUTOMATIC CONTROL FOR AUDIBLE ELECTRONIC WARNING SYSTEM

Richard F. Cieslak, Algonquin, and John V. Balding, Palatine, both of Ill., assignors to Industrial Electronics Service Co., Schaumburg, Ill.

Filed July 9, 1973, Ser. No. 377,644
Int. Cl. G08b *3/00*
U.S. Cl. 340—384 E **6 Claims**

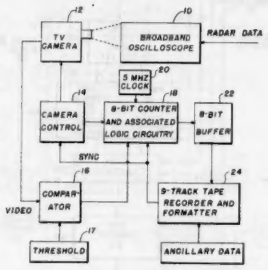


1. An electronic siren including an audio speaker and an amplifier for producing sound at continual maximum audio output from said speaker in response to frequency variations transmitted to said amplifier, including frequency responsive amplifying means for an audio speaker, a voltage controlled sweep oscillator circuit for supplying a variable frequency to said amplifying means to provide frequencies distinguished from ambient sounds, modulating means for supplying a variable control voltage to said oscillator circuit, a timing oscillator circuit, said timing oscillator circuit including variable and settable means for supplying a pulsating voltage, a shaping network for changing the pulsating voltage of said oscillator circuit into a slowly rising and falling voltage which repeats in a cyclic manner, a variable rate pulse oscillator controlled by the output of said shaping network, a second shaping network for shaping the output of said variable rate pulse oscillator circuit means for imposing a varying cyclic voltage from said second shaping network on the voltage wave form supplied by said first shaping network in said modulating means to thereby produce a number of periodically rising and falling minor voltage variation on the main voltage wave supplied to said sweep oscillator circuit to thereby produce an amplifier control frequency having the characteristic of a cyclically recurring, slowly rising and falling main frequency of sound occurring over a preselected interval of time and a number of rising and falling minor frequencies occurring within said major frequency variation during each cycle of said main frequency while it is at maximum continual level.

3,889,257
BROADBAND RADAR SIGNAL SAMPLER UTILIZING TELEVISION SCANNING

George M. Dillard, San Diego, Calif., assignor to The United States of Amercia as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 1, 1974, Ser. No. 457,147
Int. Cl. G01s *7/42, 9/02*
U.S. Cl. 343—6 TV **5 Claims**

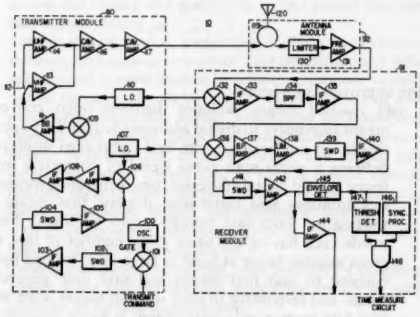


5. A method for reconstructing high-resolution radar signatures comprising the steps of displaying incoming radar data, viewing said displayed data by means of a TV camera rotated 90° from its normal position relative to said means for displaying said radar data, scanning said camera so that interlacing of vertical scans is eliminated to produce video representations of said data, converting said representations into digital counts every horizontal sweep period.

3,889,258
NAVIGATION RANGING SYNCHRONIZATION

Jerry D. Holmes, Dallas, and Samuel D. Moore, Plano, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Aug. 22, 1973, Ser. No. 390,633
Int. Cl. G01s *9/56*
U.S. Cl. 343—6.5 LC **12 Claims**



1. A radio ranging system comprising:

a. means periodically to transmit from a mobile station a short time sequence of pulse position sync codes includ-

ing one code uniquely tailored for receipt only by each one of a plurality of base stations,

b. means operative in the interval between sync code sequences for transmitting a long train of uniformly time spaced range interrogation pulses,

c. transponder means to transmit a sync reply code upon receipt by each base station of the sync code tailored thereto where said reply code is the same as from all base stations but time delayed dependent upon range from said mobile station,

d. means to generate a train of receive time gates, one for each base station in response to receipt of a sync reply code from each base station with the time gates synchronized with said range interrogation pulses and of phase determined by the arrival time of a sync reply code from each base station,

e. transponder means to transmit from each base station a range reply pulse in response to receipt of said range interrogation pulses, and

f. measuring means at said mobile station for measuring the time interval between transmission of range interrogation pulses and reception of range reply pulses detected at said mobile station within a receive time gate for each said base station,

whereby reponses to range reply pulses are limited to pulses falling within said gates the phases of which automatically are adjusted for change in range due to motion of said mobile station by the periodic repetition of said sync code sequence.

3,889,259

VEHICLE SPEED SENSOR FOR SKID CONTROL SYSTEM

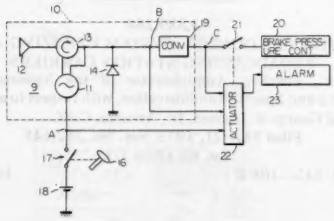
Yukitsugu Fukumori, Yokohama, Japan, assignor to Nissan Motor Company Limited, Yokohama, Japan

Filed Jan. 21, 1974, Ser. No. 435,014

Claims priority, application Japan, Jan. 22, 1973, 48-8564

Int. Cl. G01s *9/44;* **B60t** *7/00*

U.S. Cl. 343—7 ED **7 Claims**



1. A vehicle speed sensor for a skid control system for a wheeled vehicle having a source of electrical power and a brake pedal, comprising;

a doppler radar system operatively mounted on the vehicle to produce an electrical speed signal having a voltage analogous to the speed of the vehicle when connected to the source; and

a first switch operative to connect said doppler radar system to the source when the brake pedal is depressed.

3,889,260

ANALOG ECHO PROTECTION CIRCUIT FOR DME

Earl Harris Griffin, Los Angeles, Calif., assignor to RCA Corporation, New York, N.Y.

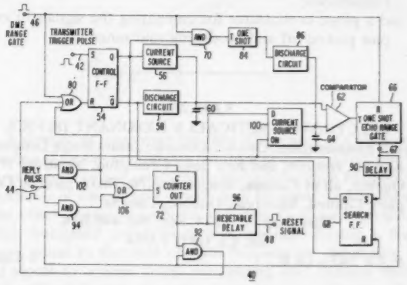
Filed Jan. 2, 1974, Ser. No. 430,212

Int. Cl. G01s *9/56*

U.S. Cl. 343—7.3 **5 Claims**

1. In a distance measuring system of the type which transmits a series of interrogation pulses toward a remote beacon and receives a stream of pulses from said beacon including reply pulses synchronized with said interrogation pulses; the improvement comprises the combination therewith of apparatus for determining, within a given range interval, the position of a set of synchronized reply pulses; said apparatus comprising:

a. first means including a first timer initially set to a time t_1, where t_1 has a given value corresponding to a certain range within said given range interval, for determining and storing, in response to solely a first single interrogation pulse, a measure of the time t_2 corresponding to the range of the first received reply pulse which occurs after time t_1;



b. second means including a second timer for determining in response to at least one interrogation pulse subsequent to said first interrogation pulse whether reply pulses continue to occur substantially at time t_2; and

c. third means coupled to said first and second means and responsive to the failure of said reply pulses to continue to occur for causing said first means to determine and store in response to solely the next following single interrogation pulse a measure of the time t_3 corresponding to the range of the first received reply pulse which occurs after time t_2, said third means being responsive only to the continuation of occurrence of said reply pulses for deriving an output signal indicating that said reply pulses which continue to occur are reply pulses synchronized with said interrogation pulses.

3,889,261

RANGE MEASUREMENT PULSE RADAR SYSTEM

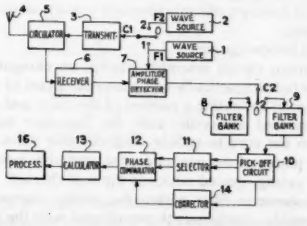
Jacques Sirven, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Sept. 20, 1973, Ser. No. 399,271

Claims priority, application France, Sept. 26, 1972, 72.34001

Int. Cl. G01s *9/24*

U.S. Cl. 343—14 **8 Claims**



1. A pulse radar system designed to provide range data, comprising a transmitter for transmitting at least two series of pulses of the same recurrence periodicity but having different carrier frequencies and a receiver comprising:

means for demodulating all the received signals by a single reference signal, in order to yield Doppler signals;

at least one bank of *n* Doppler filters each receiving said Doppler signals and supplying at *n* separate outputs, separate signals depending upon their particular Doppler frequencies, the interval between the centre frequencies of the filters in each bank being constant and equal to a sub-multiple of each difference between two emitted frequencies;

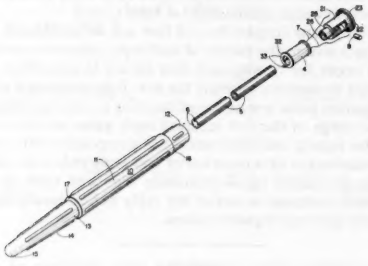
switching means respectively connected to each of the filter outputs, in order to succesively pick off pairs of signals to pairs of outputs whose Doppler frequency difference is equal to the difference between two of said transmitted frequencies;

and a phase-comparator for comparing the signals of each pair picked off and producing said range data.

3,889,262
ELECTROMAGNETICALLY RESONANT DEVICE

Detlef Zimmermann, Ottawa, Ontario; James Hugh Lougheed, Kanata, Ontario, and Eric John Crompton, Montreal West, Quebec, all of Canada, assignors to Northern Electric Company Limited, Montreal, Quebec, Canada

Filed Mar. 7, 1974, Ser. No. 448,876
Int. Cl. G01s *15/14*
U.S. Cl. 343—18 B **5 Claims**



1. A self contained electromagnetically resonant device, excitable solely by exposure to an electromagnetic or magnetic field having a suitable frequency component, the device comprising:

a rigid hollow casing;

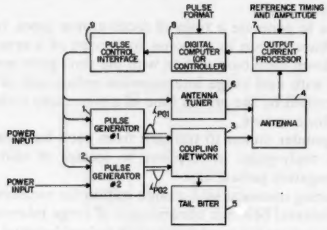
a resonant circuit assembly having, an elongated core of sintered magnetically soft material, a coil of conductive material encircling a portion of the core, and a capacitor connected across the coil, the capacitor being spaced from the core to reduce magnetic flux velocity through the plates of the capacitor, the assembly residing within the casing, spaced adjacent the wall thereof;

an elastomeric filler within the casing, surrounding said assembly, contiguous therewith and with the walls of the casing, the elastomeric filler co-acting with the casing to substantially retain the core in its original form and dimension, in the event of core breakage, so that the resonant frequency and quality of the resonant circuit assembly is substantially maintained.

3,889,263
RADIO-FREQUENCY PULSE GENERATION SYSTEM AND METHOD

Paul R. Johannessen, Lexington, Mass., assignor to Megapulse Incorporated, Bedford, Mass.

Filed Nov. 15, 1973, Ser. No. 415,970
Int. Cl. G01s *1/20*
U.S. Cl. 343—103 **20 Claims**

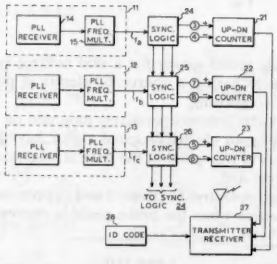


1. A method of generating radio-frequency pulses of predetermined pulse shape, that comprises, generating one of a positive and negative half-cycle of radio-frequency current, generating the opposite half-cycle of such radio-frequency current, adjusting the timing of such generating and combining said half-cycles to produce a resultant complete cycle of said radio-frequency, applying said complete cycle to impulse-excite a network coupled to a load, and adjusting the network and load to provide a resultant transfer function characteristic yielding upon excitation by a cycle of said radio-frequency current a load pulse of substantially the predetermined pulse shape, the said complete cycle controlling the first half cycles of the leading edge of the load pulse current and the said network and load characteristic controlling the remaining half cycles thereof.

3,889,264
VEHICLE LOCATING SYSTEM UTILIZING AM BROADCASTING STATION CARRIERS

James C. Fletcher, Administrator of the National Aeronautics and Spaced Administration, with respect to an invention of George R. Hansen, Jr., Arcadia, Calif.

Filed May 21, 1973, Ser. No. 362,145
Int. Cl. G01s *1/32*
U.S. Cl. 343—105 R **10 Claims**



5. In a radio position finding system of the hyperbolic isophase line type in which a plurality of signals are received and compared as to phase in pairs, thereby effectively providing a family of isophase lines from each pair, lines from one pair crossing lines of other pairs to provide a grid covering a geographic area, three spaced apart and unsynchronized AM broadcasting stations, each transmitting at a different fre-

quency, and a receiver carried by said vehicle as it moves about in said area, said receiver comprising

three receiver channels, each tuned to a different station and each having means for multiplying the signal received to a predetermined frequency, the output signal of each channel at said predetermined frequency being in phase with the signal received from a broadcast station,

three up-down counters, each for comparing the phase of a different pair of channel output signals by counting up cycles of one channel output signal, and counting down cycles of another channel output signal of the pair being compared, and

means for coupling said channel output signals to said counters in pairs.

3,889,265

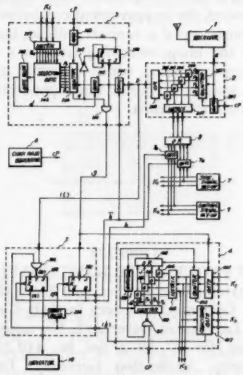
STATION DISTINGUISHING SYSTEM IN OMEGA RECEIVER

Hideki Tanaka; Kazutak: Ishida, both of Osaka; Mikio Watanabe, Kobe; Mitsuhiro Inouchi, Nishinomiya; Shigeru Yoshioka, Kobe; Minoru Handa, Ikoma, and Asao Kitabatake, Kakogawa, all of Japan, assignors to Furuno Electric Company, Limited, Japan

Filed Apr. 12, 1974, Ser. No. 460,365

Int. Cl. G01s *1/30*

U.S. Cl. 343—105 R **6 Claims**



1. A station distinguishing system for selecting a signal of a required transmitting station from the omega signals transmitted by the omega transmitting stations in time division fashion, comprising means for receiving said omega signals and producing a first train of envelope waveforms of said omega signals in the order of reception, means for selecting a pair of envelope waveforms having a duration corresponding to said required station out of said envelope waveforms and producing a pair of selection signals corresponding to said pair of envelope waveforms, and means for distinguishing one of said selection signals which corresponds to said required station and producing a reference signal which corresponds to said required station.

3,889,266

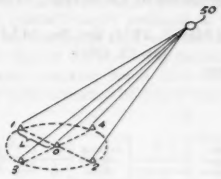
MULTIPLE CORRELATION METHOD AND APPARATUS FOR MEASURING AND SUMMING TIME DIFFERENCES

James F. Bartram, Darien, Conn., assignor to The Dewey Electronics Corporation, Paramus, N.J.

Filed Jan. 22, 1959, Ser. No. 788,463

Int. Cl. G01s *11/00*

U.S. Cl. 343—112 R **16 Claims**



1. A method of measuring the time differences of a plurality of electrical signals comprising the steps of deriving frequency components of two of said signals, multiplying each frequency component of one of said signals by a frequency component of the other of said two signals, selecting from each product of the multiplied components a component having a frequency equal to the sum of their frequencies, subjecting a third signal to a time delay, multiplying said delayed third signal with said sum frequency components, selecting the substantially zero frequency components of said last multiplication, and measuring said substantially zero frequency component for different amounts of said time delay.

3,889,267

RADIO INTERFEROMETER

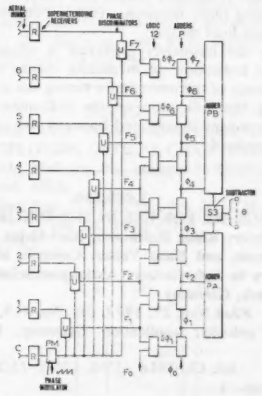
David Adrian Lucas, and Richard Paul Vincent, both of Salfords, near Redhill, England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 11, 1973, Ser. No. 359,227

Claims priority, application United Kingdom, May 17, 1972, 23110/72

Int. Cl. G01s *3/48*

U.S. Cl. 343—113 R **9 Claims**



1. A vertical radio interferometer system comprising a vertically-extending rectilinear array of equally-spaced aerial elements forming between a common element and each of the other elements respectively a plurality of interferometer pairs of which the spacing increases in arithmetical progression, a series of phase discriminators each associated with a respective interferometer pair to derive therefrom a respective

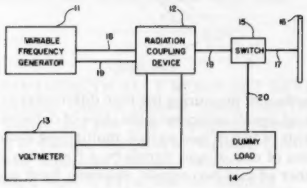
phase-difference measurement in digital form and digital logic means to derive from the series of respective measurements an average phase measurement representative of the vertical angle θ of radiation incident on the aerial array.

3,889,268

METHOD OF ANTENNA TUNING

Carl I. Peters, Vista, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 1, 1974, Ser. No. 447,175
Int. Cl. G01r
U.S. Cl. 343—703 **3 Claims**



1. An antenna tuning system for adjusting the physical dimensions of an antenna to an electrically resonant length at a predetermined frequency comprising:

a frequency generator means for supplying a variable radio frequency output in the range of frequencies at which the antenna will resonate;

means responsive to radio frequency radiation coupled to said generator output for supplying a direct current voltage output in proportion to the output of said radio frequency generator;

measuring means electrically coupled to said radiation responsive means for providing an indication of direct current voltage output;

load means electrically coupled to receive a radio frequency output from said radio frequency radiation responsive means; and

switch means electrically coupled to said radio frequency radiation responsive means and operable for selectively switching radio frequency energy between said antenna and said load means;

whereby the frequency generator is adjusted to give an output indication on measuring means at the resonant frequency of the antenna for tuning the antenna by comparing the indication on the indicating means as the switch means is operated between the antenna and the dummy load.

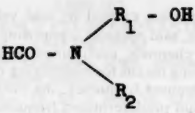
3,889,269

AQUEOUS INK FOR USE IN THE INK JET PROCESS

Rudolf Meyer; Klaus Hoffmann; Karl-Heinz Freytag, all of Leverkusen, and Hans Vetter, Cologne, all of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen-Bayerwerk, Germany

Filed Nov. 27, 1973, Ser. No. 419,260
Claims priority, application Germany, Dec. 1, 1972, 2258835
Int. Cl. C01d *15/16, 15/18, 15/20*
U.S. Cl. 346—1 **4 Claims**

1. In a process for producing an image on a surface by the application of an ink the steps comprising moving a surface on a support, forming a jet of ink containing water soluble dye in an aqueous solution, directing the ink in the form of a jet onto the moving surface, modulating the applied ink jet by electrical signals, said signals being related to the image wherein the improvement comprises the ink in addition contains as a substance that prevents drying a compound of the formula



in which

R_1 is an alkylene group containing up to 4 carbon atoms, and

R_2 is a hydrogen atom or an alkyl group containing up to 4 carbon atoms.

3,889,270

INK JET RECORDING MATERIAL

Klaus Hoffmann; Hans-Dieter König, and Rudolf Meyer, all of Leverkusen, Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen-Bayerwerk, Germany

Filed July 10, 1973, Ser. No. 378,014
Claims priority, application Germany, July 15, 1972, 2234823
Int. Cl. G01d *15/18, 15/20*
U.S. Cl. 346—1 **8 Claims**

1. In a process for information recording comprising producing a fine jet of colored liquid, directing the jet of colored liquid onto a recording medium, modulating the density of the applied jet by an electric field in accordance with the information to be recorded, the improvement comprising the recording medium consisting of a support with an image-receiving layer, wherein the image-receiving layer is a molecular or colloidal disperse substance, which is wetted by the colored liquid and into which the colored liquid penetrates to a depth in the order of a few microns.

3,889,271

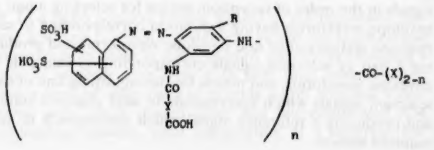
INK JET PROCESS UTILIZING NOVEL DYES

Karl-Heinz Freytag; Rudolf Meyer, and Klaus Hoffman, all of Leverkusen, Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen-Bayerwerk, Germany

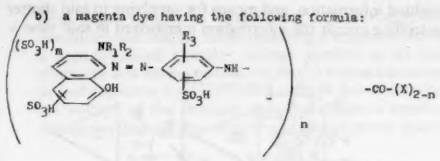
Filed Nov. 27, 1973, Ser. No. 419,259
Claims priority, application Germany, Dec. 1, 1972, 2258836; Dec. 1, 1972, 2258837; Dec. 1, 1972, 2258804
Int. Cl. G01d *5/46, 15/16, 15/18*
U.S. Cl. 346—1 **2 Claims**

1. A process for the production of an image on a support, wherein a jet of ink is imagewise modulated by electrical signals and is directed at a support having a component of movement perpendicular to the direction of the ink jet, wherein the improvement comprises containing in the ink an aqueous dye solution including one or more dyes selected from the group consisting of the following:

a. a yellow dye having the following formula:



b) a magenta dye having the following formula:



in which formulae

X is an alkyl or alkylamino group

Y is a divalent saturated or unsaturated aliphatic group which may be interrupted by an oxygen atom

R is hydrogen or an alkyl or alkoxy group

R_1 is hydrogen or an alkyl group

R_2 is hydrogen or an alkyl group

m is 0 or 1

n is 1 or 2 and

c. a cyan dye which is a copper phthalocyanine containing sulfo groups

said included dye or dyes being present in an amount effective in providing in the ink the property of light absorption in the spectral range related to the respective dye.

3,889,272

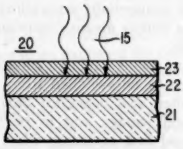
METAL FILM RECORDING MEDIA FOR LASER WRITING

David Yuan Kong Lou, Chatham, and Ronald Howard Willens, Warren, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 30, 1974, Ser. No. 474,715

Int. Cl. G01d *15/34*

U.S. Cl. 346—1 **12 Claims**



1. A method for recording information in a metal film recording medium by selectively removing portions of a thin metal radiation-absorbing film supported on a flexible transparent substrate, the method comprising exposing the metal radiation-absorbing film to modulated coherent radiation of sufficient power and duration to remove the portions, CHARACTERIZED IN THAT the film comprises a first layer of fine-grain crystallites of the metal and a second layer of coarse-grain crystallites of the metal.

3,889,273

APPARATUS FOR DIAGNOSING A TECHNICAL OBJECT, ESPECIALLY A MOTOR VEHICLE

Hans-Dieter Deiss, Gifhorn; Erich Spengler, and Gerard Georges, both of Wolfsburg, all of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Continuation of Ser. No. 167,287, July 29, 1971, abandoned. This application Oct. 4, 1973, Ser. No. 403,478

Claims priority, application Germany, July 29, 1970, 2037531

Int. Cl. G01d *1/00*

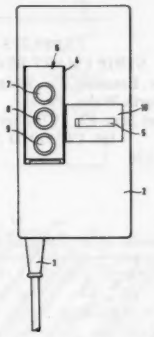
U.S. Cl. 346—33 R **7 Claims**

1. An apparatus for performing the diagnostic checking of a technical object, such as a motor vehicle, according to a predetermined checking program formed by a sequence of checking points, comprising

a manually operable portable control device having a housing formed in the shape of a box adapted to be held by a single hand, at least a pair of signal keys associated with a state of the instantaneously performed checking point disposed on the same housing side of said control device,

an information storage device remotely displaced from said control device and adapted to store checking result data for said checking points,

information channels for said checking result data between said control device and said information storage device, electrical contact means arranged in said housing and operable by said signal keys, said contact means lying in electrical circuits for delivering electrical signals representing said checking result data to said information channels upon actuation of one of said signal keys,



checking point identification means in said control device comprising a printed tape carrying checking point identifications on lines running transversely with respect to the longitudinal dimension thereof, means for stepwise advancing said tape, and a window provided in the housing on said same side thereof and adapted to show one line of said tape,

said means for advancing including movable means connected to all of said signal keys, such that actuation of any of said signal keys causes operation of only the associated one of said contact means as well as advancing said tape to identify the checking point to be performed next in conformity with said sequence.

3,889,274

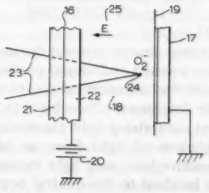
ELECTROSTATIC PRINTING APPARATUS AND METHOD EMPLOYING OPTICAL CHARGE DEPOSITION

Rudolph A. Cola, Malvern, Pa., assignor to Burroughs Corporation, Detroit, Mich.

Filed June 7, 1973, Ser. No. 367,736

Int. Cl. G01d *15/06*

U.S. Cl. 346—74 J **2 Claims**



1. An electrostatic printer for recording a charge image on the first of two surfaces of a printing medium in response to signals representing said image in terms of a plurality of posi-

tions on said first surface and the desired presence or absence of charge at each of said positions comprising:

a printing station including an electromagnetic radiation transmissive electrode disposed opposite said first surface and a second electrode disposed adjacent said second surface; a source of coherent electromagnetic radiation disposed

outside of said printing station;

means for modulating said radiation in accordance with said signals;

means for focusing and selectively deflecting said radiation in response to said signals through said radiation transmissive electrode to selectively form a point source of charge above said first surface; and

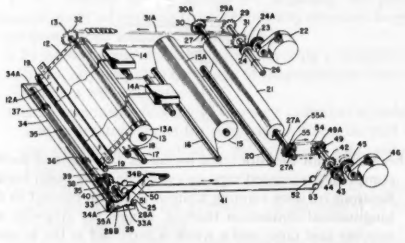
means for applying a voltage across said electrodes for attracting said charge to said first surface to form said image.

3,889,275

STRIP CHART RECORDER

Roger L. Miller, Lansdale, Pa., assignor to Leeds & Northrup Company, North Wales, Pa.

Filed June 17, 1974, Ser. No. 479,940
Int. Cl.[2] G01D *15/24*
U.S. Cl. 346—136 **7 Claims**



1. A strip chart recorder comprising unidirectional chart driving means for moving chart from a chart supply, past means for recording on said chart to means for storing said chart after application of a record thereon, and independently operable reversible chart driving means operable in one direction for moving chart from said means for storing said chart to a location for review of said record thereon and operable in a second direction for moving said chart from said location for review back to said means for storing said chart.

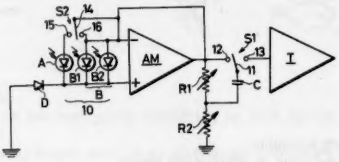
3,889,276

ELECTRONIC SHUTTER CONTROL DEVICE FOR CAMERAS

Osamu Shirai, Nakano, Japan, assignor to Kabushiki Kaisha Cosina, Nakano-shi, Japan

Filed Jan. 2, 1974, Ser. No. 429,585
Claims priority, application Japan, Dec. 29, 1972, 48-2514
Int. Cl. G03b *7/00*
U.S. Cl. 354—31 **6 Claims**

1. In an electronic shutter control device having a shutter movable between opened and closed positions, and a shutter controlling circuit that automatically controls exposure time depending on the brightness of an object to be photographed; the improvement comprising light measuring means for measuring the brightness of light from an object that enters through the objective lens, said light measuring means measuring the light incident to the central portion of the image plane before the shutter is opened and measuring the light incident to the peripheral portion of the image plane after the shutter is opened, means to weight the information obtained by said measuring means, memorizing means to memorize said weighted information, and means for supplying to said shutter controlling circuit the information memorized in said memorizing means before the shutter is opened, in overlapping relation with the information after the shutter is opened.

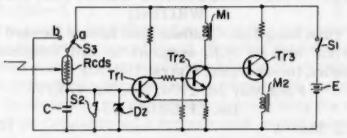


3,889,277

DEVICE FOR CONTROLLING EXPOSURE FACTORS IN CAMERAS

Mitsutoshi Ogiso, and Tetsuya Taguchi, both of Kawasaki, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 225,854, Feb. 14, 1972, abandoned.
This application Aug. 30, 1973, Ser. No. 392,969
Int. Cl. G03b *7/08*
U.S. Cl. 354—36 **13 Claims**



1. A device for sequentially controlling a diaphragm aperture means and a shutter means comprising in combination:

a power source;

a first switching means having a capacitor across its input and arranged to be switched from a first to a second condition when said capacitor charges up past a first predetermined voltage and to be switched from said second to said first condition when said capacitor discharges past a second lower predetermined voltage;

diaphragm aperture control means connected to said first switching means and said diaphragm aperture means, said control means comprising:

aperture varying means connected with said diaphragm aperture means for varying diaphragm aperture in accordance with the length of a time period defined by said first switching means while said capacitor charges, and

electrically controlled means connected with said aperture varying means and said first switching means for controlling said varying means to define the aperture of said diaphragm aperture means;

shutter control means connected to said first switching means and said shutter means to define the open time of said shutter means by said first switching means while said capacitor discharges;

an input circuit for said first switching means including said capacitor and determining its rate of charge and its rate of discharge and including:

a first and second variable resistor means,

a second switching means having two conditions such that in one of said conditions, and then only, said first variable resistor means is placed in a charging path for said capacitor and in the other of said conditions, and then only, said second variable resistor means is placed in a discharge path for said capacitor, and

circuit means associated with said input circuit for limiting the voltage to which said capacitor is charged at a constant level above said first predetermined voltage, which

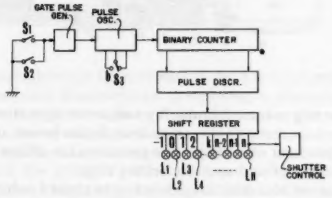
level is not subject to variation for any photographing condition, said circuit means including a transistor having a predetermined constant voltage applied to its base electrode and having another of its electrodes connected to said capacitor for overflowing current therefrom when the voltage of the charged capacitor passes a constant voltage level lower than the voltage of said power source.

3,889,278

ELECTRIC SHUTTER CONTROL CIRCUIT

Hisatoshi Takahata, and Kohji Tanikawa, both of Shimosuwamachi, Japan, assignors to Yashika Co., Ltd., Tokyo, Japan

Filed May 13, 1973, Ser. No. 365,427
Claims priority, application Japan, June 6, 1972, 47-56329
Int. Cl. G03b *7/08*
U.S. Cl. 354—50 **4 Claims**



1. An electric shutter control circuit comprising a first pulse oscillator means for producing a train of pulses at a pulse frequency corresponding to the illumination intensity of the scene to be photographed, control means for establishing a time interval in accordance with exposure parameters other than scene brightness, a multi-stage counting and memorizing means operable prior to an exposure for counting and memorizing the number of pulses produced from said first pulse oscillator means during said interval, a second pluse oscillator means for producing a train of pulses at a predetermined pulse frequency and operable after said interval for shifting the content of the counting and memorizing means to the last stage thereof, and a shutter circuit receiving the last stage output of said counting and memorizing means including means responsive to the time required for shifting the content of said counting and memorizing means to the last stage thereof for controlling the open time of a shutter.

3,889,279

ELECTROMAGNETICALLY OPERATED PHOTOGRAPHIC SHUTTER IN MICROPHOTOGRAPHIC MECHANISMS

Heinrich Klemann, Burgsolms, and Herbert Leiter, Wetzlar, both of Germany, assignors to Ernst Leitz GmbH

Continuation of Ser. No. 172,003, Dec. 6, 1972, abandoned.
This application Jan. 8, 1973, Ser. No. 321,950
Claims priority, application Germany, Sept. 6, 1970, 2044646
Int. Cl. G02b *21/36;* **G03b** *9/14*
U.S. Cl. 354—79 **5 Claims**

1. A compound lens system having an optical axis, a photographic image recorder along said optical axis, and means for optically viewing through said lens system located to one side of said optical axis, the improvement comprising an electromagnetically operated shutter having electromagnets for said recorder comprising:

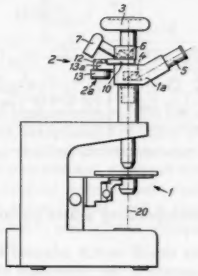
a light passage aperture along said optical axis;

first shutter blade means having a first blade and a second blade extending from a first apex at an angle to one another;

second shutter blade means having a third blade and a fourth blade extending from a second apex at an angle to one another;

said first and second shutter blade means located between said means for viewing and said photographic image recorder;

said first and second shutter blade means having means for rotatably mounting at said first and second apex, said means for rotatably mounting having second and third axes parallel to said optical axis;



said second and third axes disposed to the opposite side of said optical axis from said means for optically viewing;

said first and third blades cooperating to cover said aperture in the closed position; and

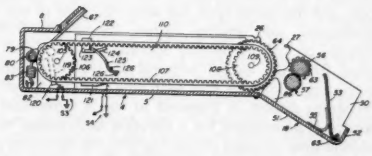
said second and fourth blades actuated by said electromagnets having magnetic cores and said electromagnets and magnetic cores disposed on one side of said optical axis opposite said means for optically viewing.

3,889,280

BELT DRIVEN AUTOMATIC REFLEX CAMERA

Conrad H. Biber, Needham, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Dec. 20, 1973, Ser. No. 426,948
Int. Cl. G03b *17/50, 19/12*
U.S. Cl. 354—86 **8 Claims**



3. In a camera, means forming a housing, motor means mounted in a first end of said housing, film processing means mounted in a second end of said housing opposite said first end and drivable to process a film unit advanced into engagement therewith, means forming a compartment in said housing between said motor means and said film processing means for receiving a supply of film units, means forming a framing aperture in said compartment to facilitate the successive exposure of film units in said compartment, mirror means, means mounting said mirror means for movement between first and second positions relative to said framing aperture, means comprising an endless flexible timing belt drivingly connecting said motor means to said processing means, an actuating element on said timing belt, means operated by said actuating element for moving said mirror means from its first to its second position, and means operated by said actuating element for advancing a film unit exposed in said framing aperture into engagement with said processing means.

3,889,281
CAMERA INCORPORATING DATA RECORDING DEVICE

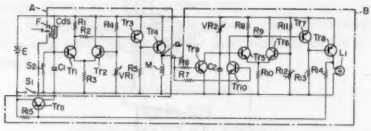
Tetsuya Taguchi, Kawasaki; Mutsunobu Yazaki, and Mutsuhide Matsuda, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 6, 1973, Ser. No. 394,651

Claims priority, application Japan, Sept. 11, 1972, 47-91091

Int. Cl. G03b *17/24*

U.S. Cl. 354—109 **2 Claims**



1. A camera incorporating a data recording device, comprising:

a power source on-off switch adapted to be opened and closed in response to the depression of a shutter release button;

a shutter control circuit including a first time constant circuit comprising a photoelectric element and a capacitor, a switching circuit, an electromagnet for controlling a shutter closure member, and a circuit for activating said electromagnet;

a data carrier;

an optical system;

a data recording circuit including a light source for exposing data recorded on said carrier, a second time constant circuit for controlling an illumination time duration of said light source, and a switching circuit for intermittently illuminating said light source; and

a power source battery connected to both said shutter control and data recording circuits;

wherein an output terminal of said electromagnet activating circuit in said shutter control circuit is connected to said switching circuit in said data recording circuit, and upon the depression of the shutter release button, said electromagnet is energized to hold the shutter closure member during a time determined by said first time constant circuit, and thereafter upon the deenergization of said electromagnet, said shutter closure member is released thereby completing shutter operation and a signal is applied from the output terminal of said electromagnet activating circuit to said switching circuit of said data recording circuit, in response to which signal said light source is illuminated for a duration determined by said second time constant circuit whereby the data is recorded on a film to be recorded.

3,889,282
ZOOM LENS STRUCTURE

Shigeru Hashimoto, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed June 14, 1973, Ser. No. 369,832

Claims priority, application Japan, June 26, 1972, 47-63810; June 26, 1972, 47-75229; June 26, 1972, 47-75230

Int. Cl. G03b *7/20*

U.S. Cl. 354—196 **8 Claims**

1. A zoom lens structure comprising:

first and second optical systems;

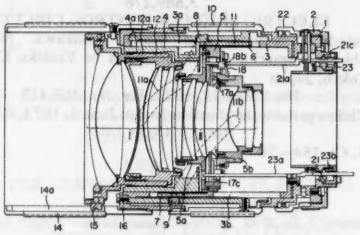
a first lens carrier for holding said first optical system;

a second lens carrier for holding said second optical system, said second carrier including adjustable aperture means including an aperture setting ring and aperture preset means operable by said aperture setting ring;

zoom operation means for moving said two optical systems relatively to each other to effect varifocal action;

focusing means for moving one of said first and second optical systems independently of the other;

aperture driving means for stopping down the adjustable aperture from a maximum open value to a preset value, set by said preset means through said aperture setting ring, and



correcting means operable by said zoom operation means for superimposing a corrective displacement upon the adjustment of said aperture preset means effected by the position of said aperture setting ring.

8. A zoom lens structure according to claim **1**, wherein said focusing means comprises means for moving said first optical system independently of said second optical system.

3,889,283
PHOTOGRAPHIC DIAPHRAGM CONTROL MEANS

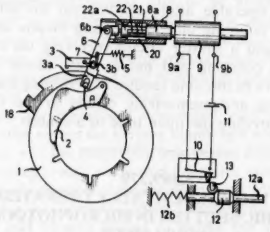
Dieter Rossmann, Aalen, Germany, assignor to Carl Zeiss Stiftung, Oberkochen, Germany

Filed Mar. 8, 1974, Ser. No. 449,399

Claims priority, application Germany, Mar. 14, 1973, 7309629

Int. Cl. G03b *9/02*

U.S. Cl. 354—272 **6 Claims**



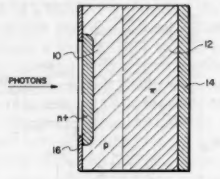
1. Photographic diagram control mechanism comprising an adjustable diaphragm movable between a fully open position and a preselected aperture position, spring means biasing said diaphragm toward one of said positions, an electromagnetic actuator including an electric coil and a plunger movable in one direction upon momentary flow of current through said coil, and alternate stroke detent mechanism operatively connecting said plunger to said diaphragm, said detent mechanism constituting means effective upon a first stroke of said plunger in said direction to move said diaphragm to one of its said positions against the force of said spring biasing means and to hold said diaphragm in such position notwithstanding discontinuance of flow of current through said coil, and effective upon a second stroke of said plunger in the same direction to release said diaphragm for return to the other of its said positions under the influence of said spring biasing means.

3,889,284

AVALANCHE PHOTODIODE WITH VARYING BANDGAP

Ernst J. Schiel, Ocean, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 15, 1974, Ser. No. 433,585
Int. Cl. H01l 15/00
U.S. Cl. 357—30 7 Claims



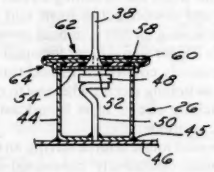
1. A photodetector for radiation in the 1.0 to 2.5 micrometer region, said photodetector comprising a photodiode including two adjacent regions of two different semiconductor materials, one of said regions comprising a photon absorption material selected from the group consisting of GaInAs and InAsP and the other of said regions comprising a material selected from the group consisting of GaAs, InAs, and InSb and containing an n-p junction biased in the avalanche mode.

3,889,285

CANISTER DIODE HAVING IMPROVED ENVIRONMENT PROTECTIVE INSULATION

Marcel F. Milewski, Allen Park, and Curtis E. Weiser, Detroit, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Feb. 20, 1974, Ser. No. 444,199
Int. Cl. H01l 3/00, 5/00
U.S. Cl. 357—72 5 Claims



1. In combination with a solid state electronic device of the type having a body of semiconductor pn junction material retained with a canister housing, at least two electrically distinct terminals in electrical communication with different regions of the semiconductor body, and an insulating means disposed within the canister housing, forming a wall thereof, to seal the semiconductor body within the housing while electrically insulating the terminals, the improvement comprising: heat flowable environmentally protective insulating material disposed across the exterior surface of the insulating means and sealingly engaging the electrical terminals and arranged to increase the direct distance path between the terminals whereby the time period required for the accumulation of foreign matter on the surface of the insulating means to short out the device may be extended, and

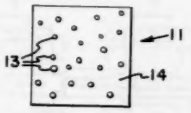
a stiffener member embedded within the heat flowable material operative to retain substantial quantities of heat flowable material, when heated, in proximity to the electrodes.

3,889,286

TRANSPARENT MULTIPLE CONTACT FOR SEMICONDUCTOR LIGHT CONVERSION ELEMENTS

John R. Debesis, Richmond Heights, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 26, 1973, Ser. No. 427,934
Int. Cl. H01l 3/00, 5/00
U.S. Cl. 357—67 7 Claims



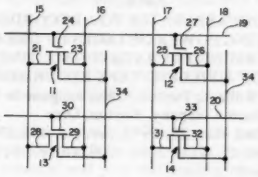
1. A transparent contact construction for a solid state light conversion element, comprising a plurality of individual electrical contact areas distributed over and attached to a surface of said light conversion element, a layer of transparent electrically conductive material disposed over said surface and in contact with said contact areas, and a conductor member electrically connected to said layer of transparent electrically conductive material.

3,889,287

MNOS MEMORY MATRIX

Michael W. Powell, Mesa, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed Dec. 6, 1973, Ser. No. 422,377
Int. Cl. H01l 11/00, 15/00
U.S. Cl. 357—23 4 Claims



1. A monolithic array of memory devices comprising a plurality of spaced parallel silicon structures on an insulating substrate, each of said structures having therein a plurality of spaced openings therein exposing the insulating substrate and thereby defining a plurality of parallel ladder-like structures having side pieces and rungs, rows of composite dielectric layers overlying aligned silicon regions, each row extending across a corresponding pair of openings and overlying the rungs and portions of the side pieces of the ladder structures, the side pieces of the ladder-like structures forming column conductors for the memory device and the rungs forming channels for the active device.

3,889,288

SYMMETRICALLY ENCODED LINE SEQUENTIAL COLOR SIGNALS

John L. Rennick, Elmwood Park, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Filed Feb. 28, 1973, Ser. No. 336,841
Int. Cl. H04n 9/36
U.S. Cl. 358—11 16 Claims

1. A system comprising a source of three primary color television signals said system comprising:

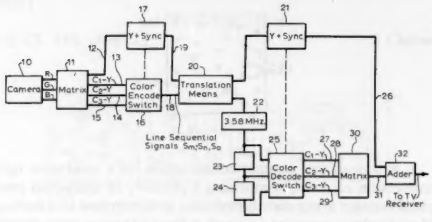
encoding means coupled to said source for composing a luminance signal Y representative of the brightness of a scene and three phase and amplitude balanced color-difference signals representative of the chromaticity of the scene, said color-difference signals being equivalent

to a resolution of an NTSC signal onto three equally spaced axes;

switch means for changing said color-difference signals into three line sequential signals of the form

$S_a=Y+0.877\cos\phi(R-Y)-0.493\sin\phi(B-Y)$,

$S_b=Y+0.877\cos(120°+\phi)\quad(R-Y)-0.493\sin(120°+\phi)\quad(B-Y)$,



$S_c=Y+0.877\cos(240°+\phi)\quad(R-Y)-0.493\sin(240°+\phi)\quad(B-Y)$,

where ϕ represents the angle between one of said line sequential signals and the R−Y axis; and means responsive to the output of said switch means for converting the line sequential encoded signals into color-difference signals of a type suitable for application to a color television receiver.

3,889,289

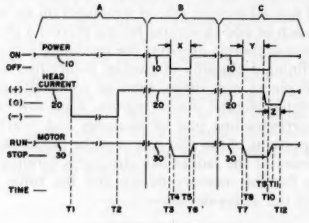
METHOD AND APPARATUS FOR RECORDING PULSES REPRESENTING POWER OUTAGES OF GREATER THAN A PREDETERMINED DURATION ON A TIMING TRACK OF A BILLING TAPE RECORDER

Reinhold W. Kubach, Dayton, Ohio, assignor to Dayton Electronic Products Company, Dayton, Ohio

Filed Mar. 29, 1974, Ser. No. 456,273

Int. Cl. G11b *5/00, 5/09;* **G01r** *13/16*

U.S. Cl. 360—6 **6 Claims**



1. A method for recording a pulse on a magnetic tape in response to a power outage condition exceeding a predetermined time interval comprising the steps of

maintaining current flow through a recording head associated with said magnetic tape after a power outage for said predetermined time interval,

thereafter terminating current flow through the recording head, and

inhibiting the resumption of recording head current for a period of time sufficient for said tape to move a distance at least equal to the gap width of the recording head upon the return to power.

3,889,290

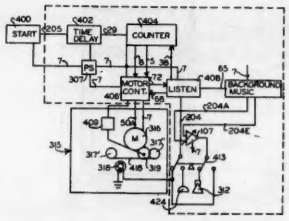
PROCESS OF PREPARING AND DELIVERING PLURALITY OF AUDIBLE MESSAGES AND APPARATUSES THEREFOR

William J. Seaton, Kearns, Utah, assignor to George B. Cree, Jr., Pampa, Tex.

Filed Aug. 27, 1973, Ser. No. 392,056

Int. Cl. G11b *15/02, 15/06*

U.S. Cl. 360—12 **5 Claims**



1. A message and background music sound producing apparatus comprising, in operative combination, a tape recorder deck, an audience sensing means, electric power voltage source, motor control circuit, a listening circuit, a background music source, a switching circuit, an amplifier and a loudspeaker in operative combination;

a. said tape recorder deck comprising a motorboard supporting an electromagnetic tape head, a tape reel support and an electric motor, said motor having an input terminal and an output terminal and said motor operatively connected to said tape reel support in driving relation therewith; said motor control circuit connecting said motor to electric power means therefor, an electrical output means on said electromagnetic tape head operatively connected to a first signal input means of said switching circuit and, in parallel therewith, to an input of said listening circuit, said first signal input means of said switching circuit operatively connected to an output terminal of said switching circuit through a transistor switching unit when the switching circuit is in tape broadcast mode and disconnected from said output terminal when the switching circuit is in background music broadcast mode; a trigger signal input terminal in said switching circuit operatively connected to said transistor switching unit in said switching circuit whereby to change the mode of said switching circuit from broadcast music mode to tape broadcast mode;

b. said background music source having an electrical output signal terminal operatively connected in series with a second signal input of said switching circuit and through said transistorized switching unit in said switching circuit to the signal output of said switching circuit when said switching circuit is in its background music mode; said switching circuit output operatively connected to the signal input of said amplifier, said amplifier having a signal output means operatively connected to the signal input of said loudspeaker;

c. audience sensing means operatively connected to switch means completing circuit connection to ground from said motor on said tape deck to said voltage source;

d. said listening circuit comprising

1. An input conductor connected to the output of said tape head on said motorboard a plate of one polarity of a capacitator directly connected to said input, the plate of opposite polarity of said capacitator being connected to the negative terminal of a first diode and the positive terminal of a second diode, the negative terminal of which second diode is grounded;

2. A first NPN transistor to the base of which are attached the positive terminal of the first diode and one end of a first bleeding resistor, the other end of which first

bleeding resistor is attached to a positive voltage and the emitter of which first transistor is grounded;

3. A second NPN transistor, the emitter of which is grounded and the collector of which connects to said positive voltage through a second load resistor and which collector is also attached to one plate of one polarity of a second capacitator, another plate of opposite polarity of which capacitator is connected to the base of said first transistor, and

4. the collector of said first transistor is connected to

i. base of a third NPN transistor the emitter of which is grounded and the collector of which is connected through a load resistor to said positive voltage and said collector of said third transistor is connected to a trigger signal line which is operatively connected to the trigger signal input terminal of said first switching circuit whereby to cut off the background music signal between said first input of the switching circuit and the output thereof on cessation of audio signal to the input of said listening circuit and a time lapse controlled by said second capacitator and said bleeding resistor, and also

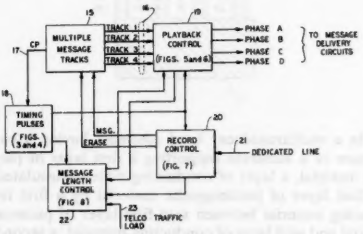
ii. the collector of the first transistor also is connected to the base of said second transistor, and

iii. the collector of the first transistor is connected to said positive voltage through a first transistor load resistor and the emitter of said first transistor is grounded.

3,889,291
MESSAGE ANNOUNCEMENT APPARATUS AND METHOD

Walter P. Walker, Atlanta, Ga., assignor to The Audichron Company, Atlanta, Ga.

Filed Apr. 18, 1974, Ser. No. 461,894
Int. Cl. G11b *15/02, 23/18*
U.S. Cl. 360—12 **20 Claims**



1. Method of recording and delivering a message in plural segments, comprising the steps of:

recording a first message segment of certain duration and having a final portion;

recording a second message segment having an initial portion which is identical both in content and in time of occurrence with said final portion of said first message segment;

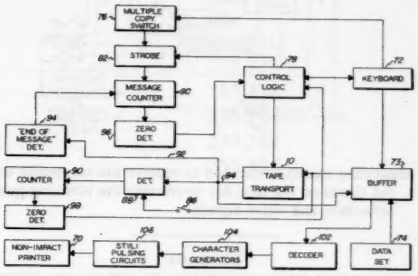
delivering a composite message comprising serially reproduced first and second message segments with synchronized concurrent reproduction of said final portion of the first message segment and said initial portion of the second message segment; and

transferring message segment delivery to said second message segment at a time during said synchronized concurrent reproduction.

3,889,292
APPARATUS FOR MAKING MULTIPLE ALPHANUMERIC COPIES OF A BINARY CODED MESSAGE

Robert P. Bocek, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Sept. 21, 1970, Ser. No. 73,817
Int. Cl. G11b *5/86, 5/18, 31/00*
U.S. Cl. 360—15 **4 Claims**



1. Apparatus for making multiple alphanumeric copies of a binary coded message contained on a magnetic recording medium, said apparatus comprising:

means including means for reading said binary coded message;

means for moving the message portion of said magnetic recording medium past said reading means;

means for conditioning said last-mentioned means for cycling said message path said reading means a predetermined number of times;

recording means responsive to said means including reading means for forming alphanumeric characters on a recording web each time said message moves past said reading means;

means responsive to said conditioning means for transporting said record medium between the beginning and end of said message and past said reading means to thereby produce multiple copies of said message in accordance with said conditioning of said apparatus;

means for writing binary codes on said magnetic recording medium, said means comprising controls for dividing messages of a predetermined length into data blocks and providing a code at the end of each data block followed by a space; and

said transporting means comprising means for sensing the number of said codes and said spaces to thereby control the transporting of said record medium between the beginning and end of message.

3,889,293
RADAR RECORDING AND REPRODUCING SYSTEM WITH PULSE MODULATION AND TIME DIVISION MULTIPLEXING

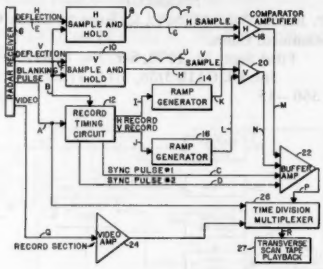
Paul F. Muraco, Turnersville, and James S. Griffin, Medford, both of N.J., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 5, 1973, Ser. No. 338,120
Int. Cl. G11b *5/02*
U.S. Cl. 360—18 **11 Claims**

1. In a single track magnetic tape recording/reproducing system, a signal processor for combining and separating CRT information including video, horizontal and vertical deflection signals, and blanking pulse, comprising:

combining means for receiving the CRT information wherein the horizontal and vertical deflection signals are encoded in pulse width modulation form during the blanking period and time-multiplexed with the video

during the nonblanking period to form a composite output signal for recording on the single track tape; and



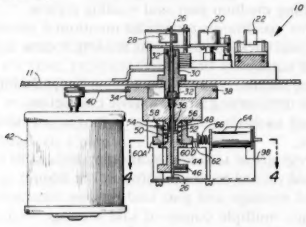
separating means connected to receive the composite output signal on the tape for recovering the blanking pulse, deflection and video signals.

3,889,294

MEANS FOR RECORDING MULTI-BIT CHARACTER DATA

Richard S. Anderson; Robert L. Crafts; John A. Murphy; Irvin L. Patterson, and Harold P. Schultz, all of Tulsa, Okla., assignors to Midwestern Instruments, Inc., Tulsa, Okla.

Filed Sept. 2, 1970, Ser. No. 69,036
Int. Cl. G11b *5/09*
U.S. Cl. 360—52 **4 Claims**



1. A recording means for recording multi-bit character data on tape at a given character-per-second rate and playing back such data at the same or a different character-per-second rate comprising:

a write head and a read head;

a rotatable capstan shaft against which tape is pressed, the rotation of the capstan shaft serving to advance the tape past the write head and read head;

a continuously rotated flywheel supported coaxially about said capstan shaft, said flywheel having, at one end thereof, a reduced diameter shoulder portion coaxial with said capstan shaft;

a drive collar affixed to said capstan shaft and having a reduced diameter shoulder portion coaxial with said capstan shaft, said flywheel shoulder and drive collar shoulder being of substantially the same diameter and adjacent each other;

a coiled spring coaxially received about said capstan shoulder and said drive collar shoulder, the normal internal diameter of the spring being slightly smaller than the external diameter of said flywheel shoulder and said drive collar shoulder, the direction of rotation of said flywheel tending to tighten said spring about said flywheel shoulder and said drive collar shoulder, said spring having a radially extending tang at the end thereof received on said flywheel shoulder;

a tubular ratchet member coaxially received about and externally of said spring, the interior diameter of said ratchet member being slightly larger than the external diameter of said spring, said ratchet member having a slot therein receiving said tang of said spring whereby said spring and said ratchet member are rotationally interlocked;

a ratchet release bar movably supported adjacent said ratchet member and movable between a first and a second position, and arranged such that in said first position said release bar engages said ratchet member preventing the rotation thereof and causing said spring to tend to unwind to thereby decouple said flywheel from said drive collar, and in said second position said release bar is removed from said ratchet member and permits the rotation of said ratchet member;

means of moving said ratchet release bar from said first to said second position for a uniform preselected time duration coincident with the receipt of each data character on said write head whereby the data character is recorded on the tape as the tape is incrementally advanced;

means of rewinding the tape; and

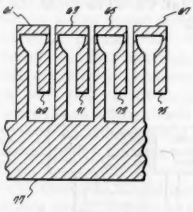
means of moving and holding said ratchet release bar from said first to said second position for continuously advancing the tape having data recorded thereon past said read head.

3,889,295

SINGLE-TURN CONDUCTOR PATTERN FOR MICROMINIATURE CORE ASSEMBLIES IN A MULTITRANSDUCER HEAD

Shahbuddin A. Billawala, Thousand Oaks, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed Oct. 9, 1973, Ser. No. 404,804
Int. Cl. G11b *5/20*
U.S. Cl. 360—123 **4 Claims**



1. In a multitransducer head assembly having a laminate structure of a substrate supporting a first layer of paramagnetic material, a layer of conducting material insulated from said first layer of paramagnetic material by a first layer of insulating material between said first layer of paramagnetic material and said layer of conducting material, a second layer of paramagnetic material insulated from said layer of conducting material by a second layer of insulating material between said layer of conducting material and said second layer of paramagnetic material, said second layer of paramagnetic material contacting said first layer of paramagnetic material at spaced locations thereof so as to form a plurality of individual magnetic cores in a straight line, said layer of conducting material formed to provide an improved single-turn conductor pattern for a plurality of individual transducers in said head, said conductor pattern comprising:

a plurality of single-turn electron paths disposed in a straight line, in the same plane, each said path defining a transducing gap and having a first and a second end;

one terminal pad connected to the first end of each of said plurality of electron paths; and

a plurality of terminal pads, equal in number to said plurality of single-turn electron paths, one terminal pad connected to the second end of each one of said plurality of single-turn electron paths.

DESIGN PATENTS

GRANTED JUNE 10, 1975

ERRATA

For CLASS	See PATENT NO.
010–078	235,321
092–015	235,338
035–003 A	235,364
027–036	235,368
010–066	235,375

Young K

U.S. Cl. D

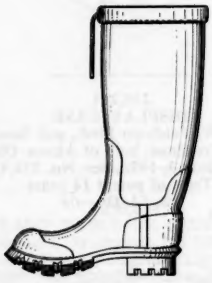
Don
F

U.S. Cl. D

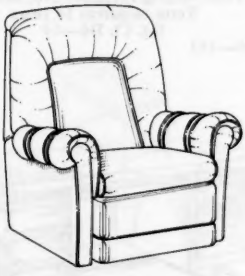
DESIGNS

GRANTED JUNE 10, 1975

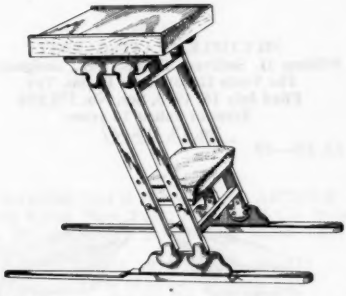
235,283
KNEE BOOT
Young Ku Lee, Seoul, Korea, assignor to Kyung Sung Rubber Co., Ltd., Jun San, Korea
Filed Nov. 7, 1973, Ser. No. 413,686
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—275



235,284
CHAIR
Don Ray Gill, Westville, Ind., assignor to Futorian Corporation, Amsterdam, N.Y.
Filed Sept. 11, 1973, Ser. No. 396,340
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—37

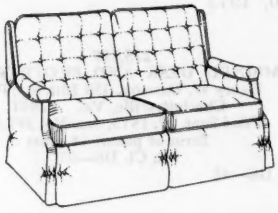


235,285
COMBINED DESK AND FOOTREST UNIT
Henry W. Dawson, 338 10th St. NW., Charlottesville, Va. 22901
Filed Sept. 17, 1973, Ser. No. 397,628
Term of patent 14 years
Int. Cl. D6—*05*
U.S. Cl. D6—42

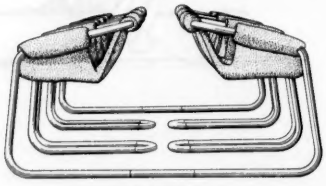


235,286
CHAIR
Arnold C. Martinelli, Lake Shore Drive, Rawdon, Quebec, Canada
Filed July 12, 1973, Ser. No. 378,612
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—56

235,287
SETTEE OR SIMILAR ARTICLE
Morris F. Fisher, Carmel, Ind., assignor to Futorian Corporation, Amsterdam, N.Y.
Filed Jan. 12, 1973, Ser. No. 323,162
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—59

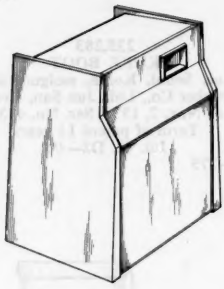


235,288
MULTIPLE SEATING UNIT
William H. Sullivan, Dallas, Tex., assignor to The Vecta Group, Inc., Dallas, Tex.
Filed July 16, 1973, Ser. No. 379,810
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—59

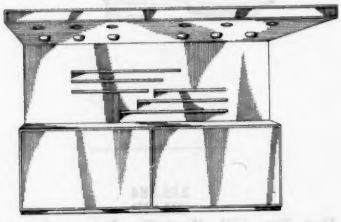


235,289
CHAIR
Stapleton Long, Morristown, Tenn., assignor to The Berkline Corporation, Morristown, Tenn.
Filed Nov. 28, 1972, Ser. No. 310,018
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—71

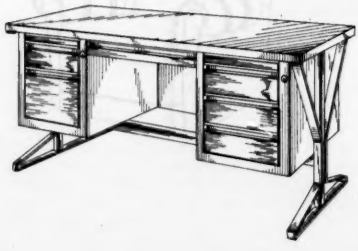
235,290
DISPENSER FOR USE WITH AEROSOL CONTAINERS
C. James Corris, Camden, S.C., assignor to Warner-Lambert Company, Morris Plains, N.J.
Filed July 2, 1973, Ser. No. 375,564
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D6—95



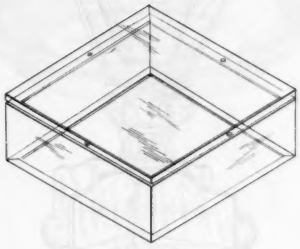
235,291
DISPLAY CASE
Jerry Shaw, 50 W. Fairlawn Blvd., and Samuel G. Solitt, 2121 Brookshire Road, both of Akron, Ohio 44313
Filed July 3, 1973, Ser. No. 376,138
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—127



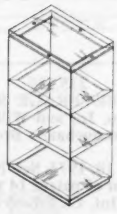
235,292
DESK
George W. Podell, Newburgh, N.Y., assignor to Monarch Metal Products, Inc., New Windsor, N.Y.
Filed Aug. 6, 1973, Ser. No. 385,953
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—161



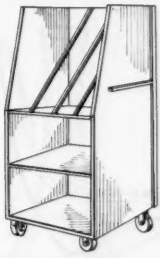
235,293
COFFEE TABLE
Simon V. Waitzman, 195 Hicks St., Brooklyn, N.Y. 11201
Filed May 9, 1973, Ser. No. 358,715
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—175



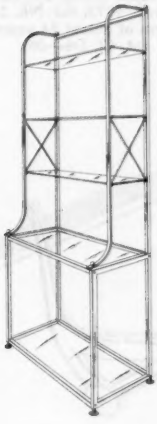
235,294
LAMP TABLE OR PEDESTAL
Simon V. Waitzman, 195 Hicks St., Brooklyn, N.Y. 11201
Filed May 9, 1973, Ser. No. 358,717
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—175



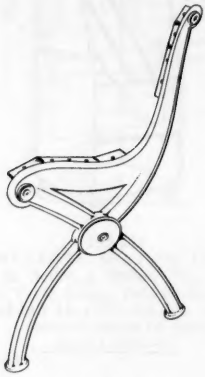
235,295
BOOK CART OR SIMILAR ARTICLE
Melville E. Junion, 104 Gregor Court, Appleton, Wis. 54911
Filed Aug. 28, 1973, Ser. No. 392,274
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—184



235,296
BAKERS RACK OR SIMILAR ARTICLE
Jonathan Ginat, New York, N.Y. (% A.C.I. Industries, Inc., 38—60 Review Ave., Long Island City, N.Y. 11100)
Filed Oct. 16, 1973, Ser. No. 406,823
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—186



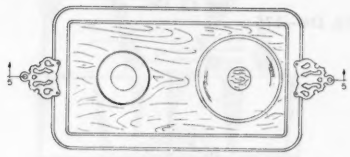
235,297
END STANDARD FOR A FURNITURE SEAT
Roger S. Schuyler, San Francisco, Calif.
(1031–B, E. Duane, Sunnyvale, Calif. 94086)
Filed Apr. 6, 1973, Ser. No. 348,482
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—194



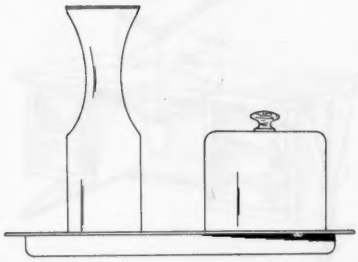
235,298
END STANDARD FOR A FURNITURE SEAT
Roger S. Schuyler, San Francisco, Calif.
(1031–B, E. Duane, Sunnyvale, Calif. 94086)
Filed Apr. 6, 1973, Ser. No. 348,483
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—194

235,299
COMBINED REVOLVING CONDIMENT SERVER AND CANDLE HOLDER OR THE LIKE
Lawrence W. Keating, 1609 Shawnee Road, Apt. 309, Lima, Ohio 45805
Filed Aug. 21, 1973, Ser. No. 390,300
Term of patent 14 years
Int. Cl. D7—*99*; D26—*01*
U.S. Cl. D7—2

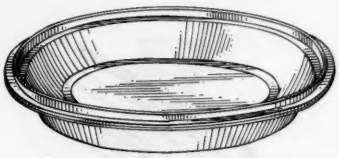
235,300
FOOD AND BEVERAGE SERVING SET
Maurice G. Mountain, Jr., and William S. Ripley, York, Pa., assignors to Susquehanna Broadcasting Co., York, Pa.
Filed Sept. 18, 1973, Ser. No. 398,475
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D7—3



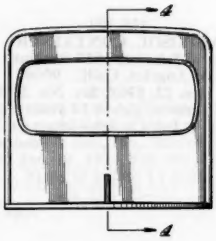
235,301
FOOD AND BEVERAGE SERVING SET
Maurice G. Mountain, Jr., and William S. Ripley, York, Pa., assignors to Susquehanna Broadcasting Co., York, Pa.
Filed Sept. 18, 1973, Ser. No. 398,476
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D7—3

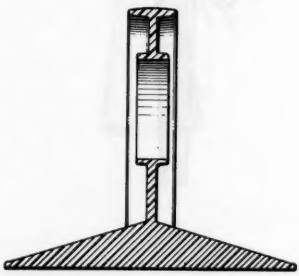


235,302
DISH
Richard W. Lanigan, 214 W. Fremont, Arlington Heights, Ill. 60004, and Oleg Szymber, 808 Roppolo, Elk Grove, Ill. 60007
Filed Mar. 28, 1973, Ser. No. 346,307
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—23



235,303
PATTY PRESS
Richard A. Boucher, 263 Davis St., Northboro, Mass. 01581
Filed Aug. 16, 1973, Ser. No. 388,873
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—43





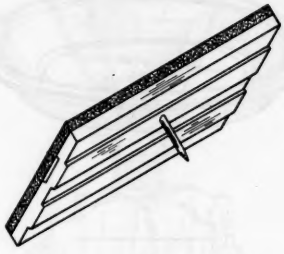
235,304
MEAT TENDERIZER
Sylvan Greenberg, 111 E. 85th St., New York, N.Y. 10028
Filed Aug. 30, 1973, Ser. No. 392,979
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—101

235,305
ARTICLE OF FLATWARE
Augusto Salviato, Corso Mario Abbiate, 110, Vercelli, Italy
Filed June 11, 1973, Ser. No. 369,027
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

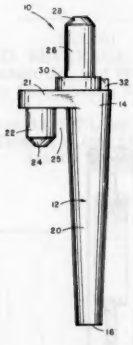
235,306
PLASTIC KNIFE
Hubert E. Christian, 4019 E. Fairmount, 85018, and David W. Lee, 1606 E. Borghese Place, 85016, both of Phoenix, Ariz.
Filed May 21, 1973, Ser. No. 362,356
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—138

235,307
COMBINED HONEY SPOON AND SPREADER
Rita Shoemaker, 800 NE. 12th Ave., I–144, Homestead, Fla. 33030
Filed Dec. 7, 1973, Ser. No. 422,765
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—149

235,308
PICTURE HANGER STABILIZER
Edwin R. Clarke, 129 S. Belmont, Wichita, Kans. 67218
Filed Oct. 17, 1973, Ser. No. 407,304
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—257



235,309
AEROSOL CONTAINER
Carol Schafer, 1627 Pontius, Los Angeles, Calif. 90005
Filed Dec. 22, 1969, Ser. No. 20,586
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—8

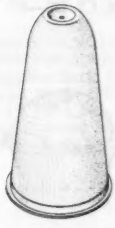


235,310
BOTTLE
Harold Anthony Betka, Waukegan, Ill., assignor to Abbott Laboratories, North Chicago, Ill.
Filed Aug. 2, 1973, Ser. No. 385,022
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—10

235,311
COMBINED BOTTLE AND CAP THEREFOR
Ronald G. Cramer, Racine, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.
Filed Jan. 12, 1973, Ser. No. 323,029
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—107

235,312
BOTTLE
Edward J. Kretz, Toledo, Ohio, assignor to Owens-Illinois, Inc.
Filed July 19, 1973, Ser. No. 380,604
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—127

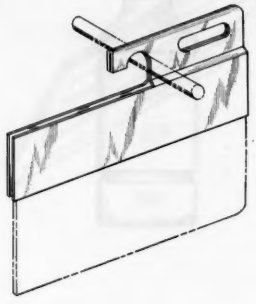
235,313
PLASTIC PREFORM CONTAINER OR THE LIKE
Bryant Edwards, Clarendon Hills, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.
Continuation-in-part of design application Ser. No. 247,913, Apr. 26, 1972. This application June 29, 1973, Ser. No. 363,470
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—171



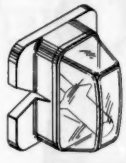
235,314
CARTON
Ronald Frederick Cramphorn, Marlow, England, assignor to Aspro Nicholas, Ltd., Slough, England
Filed Dec. 14, 1971, Ser. No. 208,052
Claims priority, application Great Britain June 26, 1971
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—222

235,315
VALVE ACTUATOR AND DISPENSING HEAD FOR A PRESSURIZED CONTAINER
Paul M. Kotuby, Naugatuck, Conn., assignor to The Risdon Manufacturing Company, Naugatuck, Conn.
Filed Mar. 5, 1973, Ser. No. 338,159
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—258

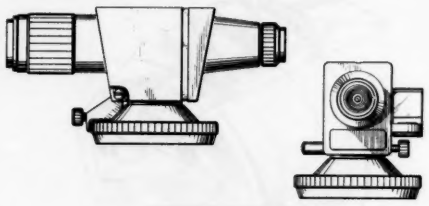
235,316
COMBINED PACKAGING CARD AND HANGER FOR AN ARTICLE OF MERCHANDISE
Charles A. Wells, Coshocton, Ohio, assignor to Pretty Products, Inc., Coshocton, Ohio
Filed Oct. 19, 1973, Ser. No. 407,799
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—291



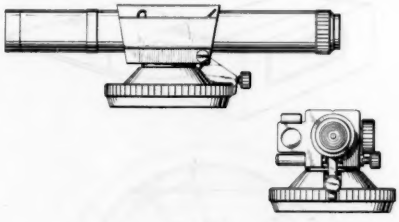
235,317
STUD FINDER
Laird F. Covey, Easton, Conn., assignor to The Stanley Works, New Britain, Conn.
Filed Feb. 26, 1973, Ser. No. 335,650
Term of patent 14 years
Int. Cl. D10—*05*
U.S. Cl. D10—46



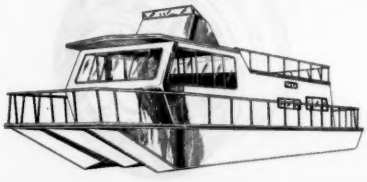
235,318
AUTOMATIC OPTICAL BUILDERS' LEVEL OR THE LIKE
J. Peter E. Kooi, Succasunna, N.J., assignor to Keuffel & Esser Company, Morristown, N.J.
Filed July 30, 1973, Ser. No. 383,924
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—66



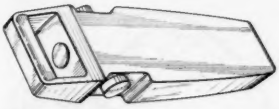
235,319
OPTICAL BUILDERS' LEVEL OR THE LIKE
J. Peter E. Kooi, Succasunna, N.J., assignor to Keuffel & Esser Company, Morristown, N.J.
Filed Aug. 10, 1973, Ser. No. 387,562
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—66



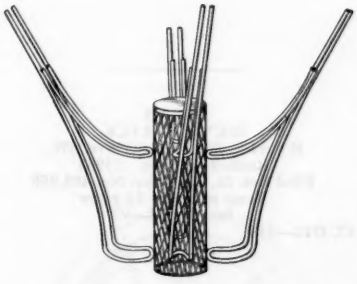
235,320
HOUSEBOAT OR THE LIKE
Richard E. Klingler, Elkhart, Ind., assignor to Holiday Rambler Corp.
Filed June 4, 1973, Ser. No. 366,725
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—67



235,321
INSTRUMENT FOR DETECTING ELECTROMAGNETIC RESONANT DEVICES
John A. Mahan, James William M. Bee, and John F. Tyson, Ottawa, Ontario, Canada, assignors to Northern Electric Company Limited, Montreal, Quebec, Canada
Filed July 31, 1973, Ser. No. 384,248
Term of patent 14 years
Int. Cl. D10—*05*
U.S. Cl. D10—78



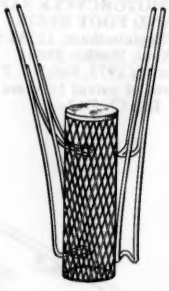
235,322
BICYCLE RACK
Robert E. Sill, 429 15th Ave. SW., Rochester, Minn. 55901
Filed Oct. 26, 1973, Ser. No. 409,952
Term of patent 14 years
Int. Cl. D8—*99*
U.S. Cl. D12—115



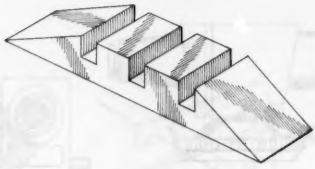
235,323
COMBINED MOTORCYCLE SAFETY BAR AND FOOT RESTS
Kenneth E. Higginbotham, 12236 SE. 200th, Kent, Wash. 98031
Filed June 15, 1973, Ser. No. 370,304
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—114

235,324
COMBINED MOTORCYCLE SAFETY BAR AND FOOT RESTS
Kenneth E. Higginbotham, 12236 SE. 200th, Kent, Wash. 98031
Filed June 15, 1973, Ser. No. 370,306
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—114

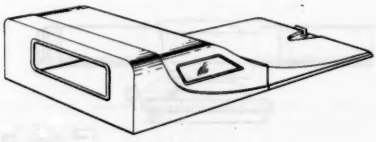
235,325
BICYCLE RACK
Robert E. Sill, 429 15th Ave. SW., Rochester, Minn. 55901
Filed Oct. 26, 1973, Ser. No. 409,955
Term of patent 14 years
Int. Cl. D8—*99*
U.S. Cl. D12—115



235,326
VEHICLE TIRE CHAIN APPLICATOR
Serge A. Couttet, Box 561, Georgetown, Colo. 80444
Filed Jan. 2, 1973, Ser. No. 319,976
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—155

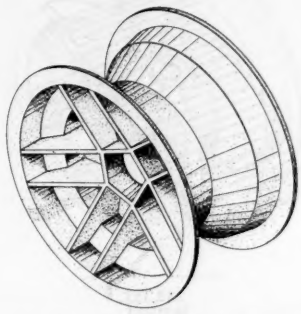


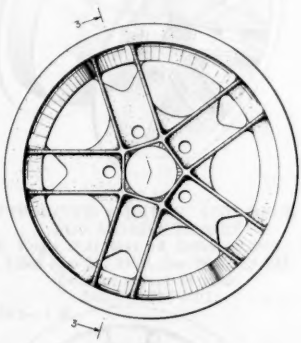
235,327
PICK-UP TRUCK CANOPY
Arthur L. Morris, 3406 Austin Court, Orange, Calif. 92669
Filed Apr. 1, 1974, Ser. No. 456,764
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—156



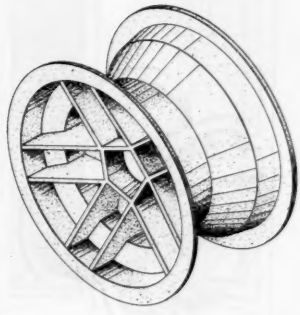
235,328
WHEEL
Donald M. Scraver, Madison Heights, Mich., assignor to The Budd Company, Troy, Mich.
Filed Sept. 4, 1973, Ser. No. 393,860
Term of patent 7 years
Int. Cl. D12—*16*
U.S. Cl. D12—211

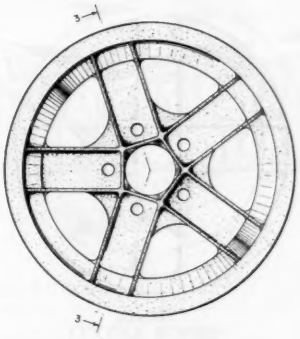
235,329
WHEEL
Steven Douglas Gageby, St. Paul, Minn., assignor to Janet Kay Gageby, St. Paul, Minn.
Filed Aug. 20, 1973, Ser. No. 390,085
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—209



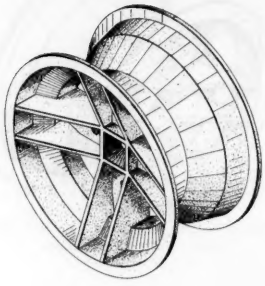


235,330
WHEEL
Steven Douglas Gageby, St. Paul, Minn., assignor to Janet Kay Gageby, St. Paul, Minn.
Filed Aug. 20, 1973, Ser. No. 390,086
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—209



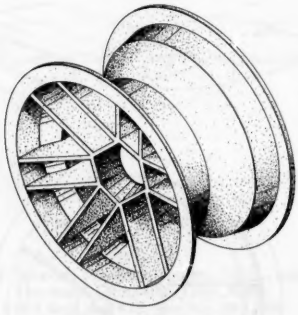


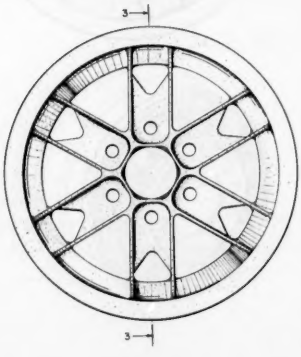
235,331
WHEEL
Steven Douglas Gageby, St. Paul, Minn., assignor to Janet Kay Gageby, St. Paul, Minn.
Filed Aug. 20, 1973, Ser. No. 390,087
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—209



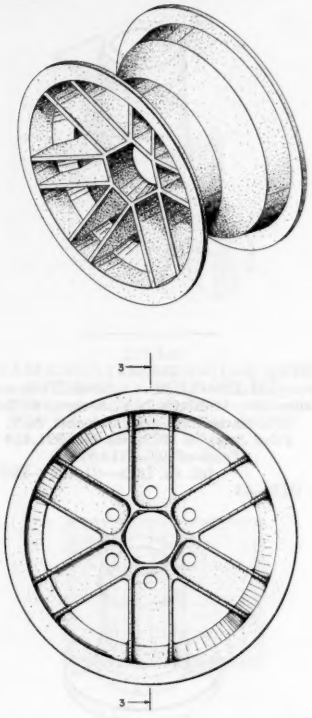
235,332
WHEEL CHOCK
Vincent J. Richilano, Lakewood, Ohio, assignor to Zephyr Industries, Inc., Ashland, Ohio
Filed Sept. 17, 1973, Ser. No. 397,987
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—217

235,333
WHEEL
Steven Douglas Gageby, St. Paul, Minn., assignor to Janet Kay Gageby, St. Paul, Minn.
Filed Aug. 20, 1973, Ser. No. 390,088
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—211

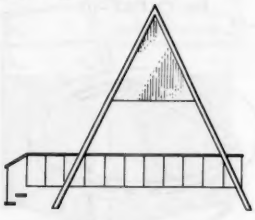




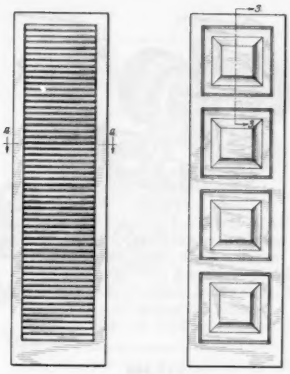
235,334
WHEEL
Steven Douglas Gageby, St. Paul, Minn., assignor to Janet Kay Gageby, St. Paul, Minn.
Filed Aug. 20, 1973, Ser. No. 390,089
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—211



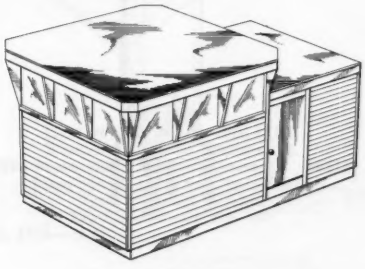
235,335
COMBINED A-FRAME AND DECK FOR MOBILE HOMES
Leon R. Engle, P.O. Box 94, Jefferson, Md. 21755
Filed Jan. 22, 1973, Ser. No. 325,323
Term of patent 14 years
Int. Cl. D25—*02*
U.S. Cl. D13—1 R



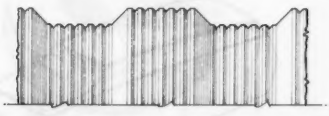
235,336
REVERSIBLE SHUTTER
Albert M. Lee, Peoria, Ill., assignor to HC Products Co., Princeville, Ill.
Filed Nov. 1, 1973, Ser. No. 411,709
Term of patent 14 years
Int. Cl. D25—*02*
U.S. Cl. D13—1 M



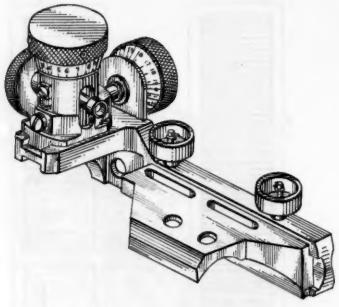
235,337
CONTROL HOUSE OR SIMILAR ARTICLE
Erbie G. Mize and W. Norman Smith, Chattanooga, Tenn., assignors to Astec Industries, Inc., Chattanooga, Tenn.
Filed Dec. 4, 1972, Ser. No. 312,052
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D13—1 R



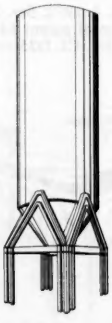
235,338
TEXTILE BOBBIN
Arthur C. Hamilton, 53 Fenley Drive, Weston, Ontario, Canada
Filed Feb. 14, 1973, Ser. No. 332,357
Term of patent 14 years
Int. Cl. 15—*06*
U.S. Cl. D19—15



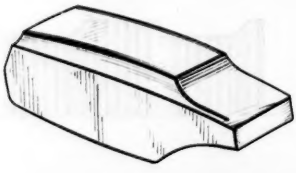
235,339
GUNSIGHT
Olle Edstrom, Langgatan 18, 82700, Ljusdal, Sweden
Filed Oct. 5, 1973, Ser. No. 403,902
Claims priority, application Sweden, Apr. 10, 1973
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D22—8



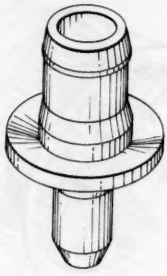
235,340
STORAGE BIN OR SIMILAR ARTICLE
Erbie Gail Mize, Chattanooga, Tenn., assignor to Astec Industries, Inc., Chattanooga, Tenn.
Filed Nov. 19, 1973, Ser. No. 417,479
Term of patent 14 years
Int. Cl. D25—*99*
U.S. Cl. D23—2



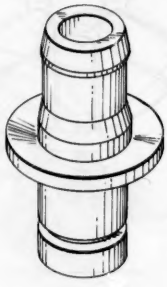
235,341
HANDLE FOR WATER CLOSETS OR THE LIKE
Stanley F. Korol, 457 Shepard Road, Mansfield, Ohio 44907
Filed Dec. 26, 1973, Ser. No. 428,293
Term of patent 14 years
Int. Cl. D23—*01*; D8—*06*
U.S. Cl. D23—29



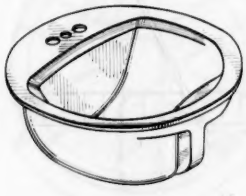
235,342
FILTER TUBE CAP
Walter Otto, Wantagh, N.Y., assignor to Sethco Manufacturing Corp., Freeport, N.Y.
Filed Aug. 24, 1973, Ser. No. 391,438
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—41



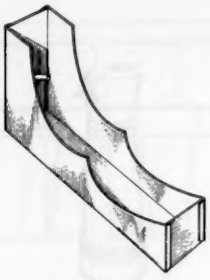
235,343
FILTER TUBE CONNECTOR
Walter Otto, Wantagh, N.Y., assignor to Sethco Manufacturing Corp., Freeport, N.Y.
Filed Aug. 24, 1973, Ser. No. 391,439
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—43



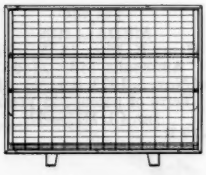
235,344
LAVATORY
Stanley F. Korol, 457 Shepard Road, Mansfield, Ohio 44907
Filed Dec. 28, 1973, Ser. No. 429,320
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—58



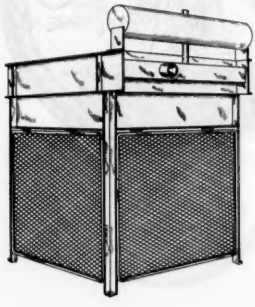
235,345
HOLDER FOR BURNING INCENSE
Joseph Fields, 140—19 Linden Blvd., Jamaica, N.Y. 11436
Filed July 5, 1974, Ser. No. 486,107
Term of patent 14 years
Int. Cl. D31—*00*
U.S. Cl. D23—78



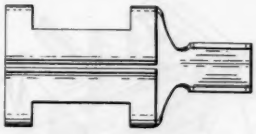
235,346
PORTABLE HEATER OR SIMILAR ARTICLE
Raymond E. Benson, Oak Park, Ill., assignor to Olin Corporation, New Haven, Conn.
Filed Oct. 15, 1973, Ser. No. 406,513
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—122



235,347
INDUSTRIAL RADIATOR FOR USE IN LOW PRESSURE WATER COOLING SYSTEMS
Fred M. Young, Racine, Wis., assignor to Young Radiator Company, Racine, Wis.
Filed May 16, 1974, Ser. No. 470,397
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—139

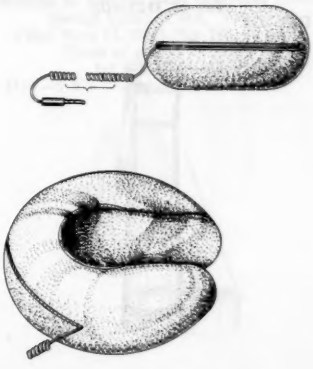


235,348
ELECTRICAL TAB RECEPTACLE
William Vito Pauza, Palmyra, and Wilmer Lee Sheesley, Harrisburg, Pa., assignors to AMP Incorporated, Harrisburg, Pa.
Filed Jan. 7, 1974, Ser. No. 431,178
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—1 A

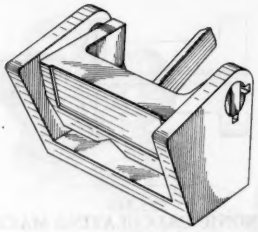


235,349
ELECTRONIC CALCULATING MACHINE
Shigeru Kurozumi, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Jan. 30, 1974, Ser. No. 437,922
Claims priority, application Japan Aug. 1, 1973
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D26—5 C

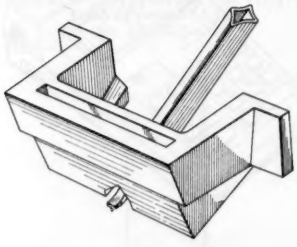
235,350
HEADPHONES OR THE LIKE
Stephen C. Hanson, Chicago, Ill. (4504 Bryan Place, Downers Grove, Ill. 60515)
Filed Feb. 2, 1973, Ser. No. 329,224
Term of patent 14 years
Int. Cl. D14—*01;* D6—*09*
U.S. Cl. D26—14 G



235,351
PHONOGRAPH STYLUS
Robert L. Deschamps, Wheaton, Ill., assignor to Shure Brothers Incorporated, Evanston, Ill.
Filed Dec. 12, 1973, Ser. No. 424,185
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D26—14 D



235,352
PHONOGRAPH STYLUS
Robert L. Deschamps, Wheaton, Ill., assignor to Shure Brothers Incorporated, Evanston, Ill.
Filed Dec. 12, 1973, Ser. No. 424,186
Term of patent 14 years
Int. Cl. D14—*01*; D14—*99*
U.S. Cl. D26—14 D

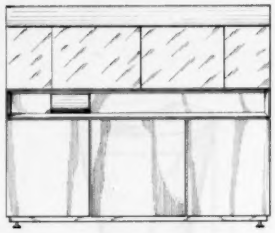


235,353
CIGARETTE LIGHTER
George L. Schick, Trumbull, Conn., assignor to Warner-Lambert Company, Morris Plains, N.J.
Filed July 1, 1974, Ser. No. 484,642
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—39

235,354
CIGARETTE LIGHTER
George L. Schick, Trumbull, Conn., assignor to Warner-Lambert Company, Morris Plains, N.J.
Filed July 1, 1974, Ser. No. 484,643
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—39

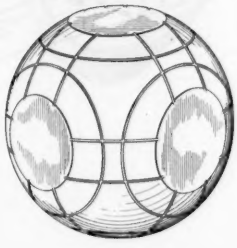
235,355
MEDALLION
Henry K. Rigg, 18 West St., Annapolis, Md. 21404
Filed Nov. 5, 1973, Ser. No. 412,543
Term of patent 3½ years
Int. Cl. D11—*02*
U.S. Cl. D29—19 R

235,356
CHEMICAL VAPOR DEPOSITION REACTOR OR SIMILAR ARTICLE
William George Faraco, Jr., 13561 Howen Drive, Saratoga, Calif. 95070
Filed Nov. 1, 1973, Ser. No. 411,728
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D32—2

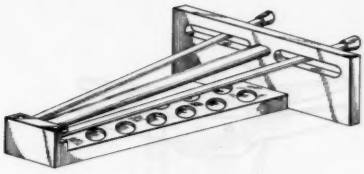


235,357
TENNIS RACKET
William H. Schaefer and Richard E. Bender, San Diego, Calif., assignors to General Dynamics Corporation, San Diego, Calif.
Filed Feb. 16, 1973, Ser. No. 333,429
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 ST

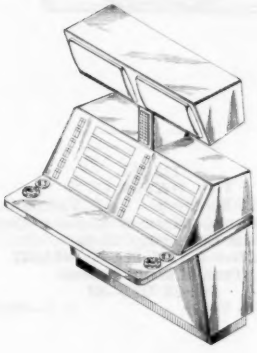
235,358
FACETED GAME BALL
André Dufaud, 20, Rue de la Republique Privas, France
Filed May 4, 1973, Ser. No. 357,517
Claims priority, application France Nov. 15, 1972
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 GP



235,359
BALL GAME BOARD OF THE HAND MANIPULATING TYPE
Stanley Sharpless Smith, Jr., P.O. Box 194, New Canaan, Conn. 06840
Filed June 28, 1973, Ser. No. 374,495
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS

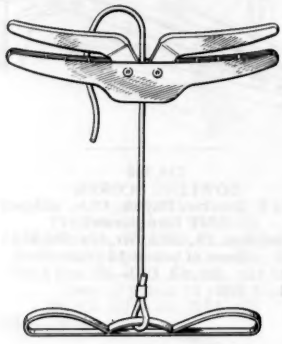


235,360
BOWLING SCORER
Stephen F. Brucker, Dayton, Ohio, assignor to AMF Incorporated
Filed Sept. 13, 1973, Ser. No. 396,880
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 DD



235,361
POOL BASKETBALL GOAL
William R. Benton, 3434 Diversion Drive, Spring Valley, Calif. 92077
Filed Nov. 12, 1973, Ser. No. 414,638
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 VV

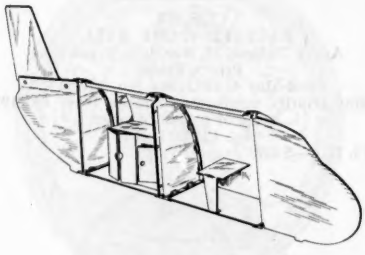
235,362
EXERCISER
Richard H. Pray, 5156 Via Valverde, Santa Barbara, Calif. 93111
Filed Dec. 19, 1973, Ser. No. 426,303
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 K



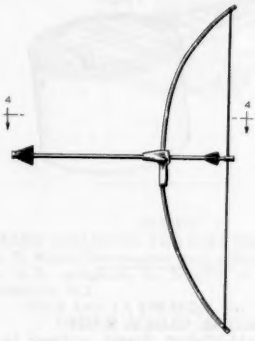
235,363
TOY WATER GUN
Francis M. L. Barthropp, West Vancouver, British Columbia, Canada, assignor to Barton of Canada Ltd., Burnaby, British Columbia, Canada
Filed Oct. 1, 1973, Ser. No. 402,122
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 VV

235,364
PLANT FEEDER
Arthur L. Fassauer, Canyon, Tex., assignor to Fassauer Industries, Inc., Canyon, Tex.
Filed May 7, 1973, Ser. No. 357,874
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D35—3 A

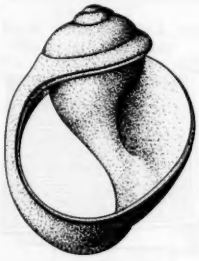
235,365
COMBINED CARRYING CASE AND PLAY SCENE FOR DOLLS
Derek J. Gay, Palos Verdes Peninsula, William H. Smedley, and Aaron G. Cohen, Los Angeles, and Michael W. Nuttall, South Pasadena, Calif., assignors to Mattel, Inc., Hawthorne, Calif.
Filed Nov. 15, 1973, Ser. No. 416,147
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 A



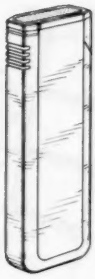
235,366
COMBINED ARCHERY GAME PROJECTOR AND SHUTTLECOCK PROJECTILE
Alexander Imatt, 1595 N. Calle La Cumbre, and Derek A. Brand, 2132 Lyndhurst Ave., both of Camarillo, Calif., 93010
Filed Dec. 6, 1973, Ser. No. 422,328
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15.22



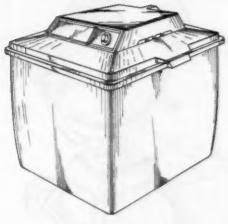
235,367
FINGER RING
George J. Yevick, 536 Nordhoff Drive, Leonia, N.J. 07605
Filed Nov. 27, 1973, Ser. No. 419,191
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D45—10 A



235,368
LIGHTER
Franz Alban Stuetzer, Muhlheim am Main, Germany, assignor to Rowenta-Werke GmbH
Filed Nov. 20, 1973, Ser. No. 417,700
Claims priority, application Germany, May 21, 1973
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—36



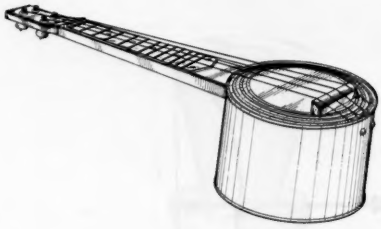
235,369
PORTABLE ELECTRIC WASHER
Downer P. Dykes, Lawrence, Kans., assignor to Rival Manufacturing Company, Kansas City, Mo.
Filed Dec. 5, 1973, Ser. No. 421,935
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D49—1 A



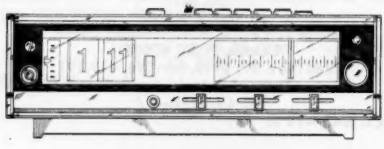
235,370
SAFETY LADDER FOR SWIMMING POOL PLATFORM
Peter F. Gannon, Troy, Mich., assignor to Vinyl-Fab Industries, Ferndale, Mich.
Filed Aug. 15, 1973, Ser. No. 388,581
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D54—1 A

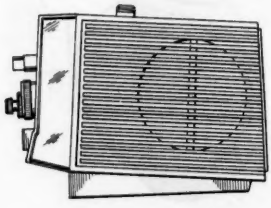
235,371
CEMENT MIXER
Jack L. Ponkey, and William H. Armstrong, Troy, Mich., assignors to The J. B. Foote Foundry Co., Fredericktown, Ohio
Filed Aug. 3, 1972, Ser. No. 277,631
Term of patent 14 years
Int. Cl. D15—*04*
U.S. Cl. D55—1 D

235,372
STRINGED MUSICAL INSTRUMENT
Frank M. Hebbert, 4599 Highland Drive, Salt Lake City, Utah 84117
Filed Nov. 13, 1972, Ser. No. 305,782
Term of patent 14 years
Int. Cl. D17—*03*
U.S. Cl. D56—1 A

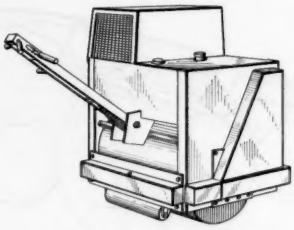


235,373
DIGITAL CLOCK RADIO
Minol Araki, Tokyo, Japan, assignor to Lloyd's Electronics Inc., Compton, Calif.
Filed Sept. 21, 1973, Ser. No. 399,283
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D56—4 B

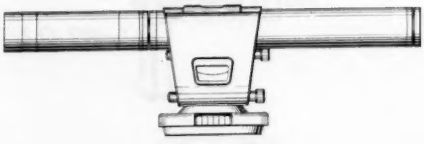




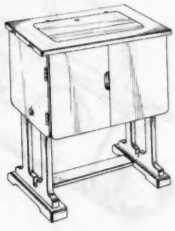
235,374
COMPACTOR
Salvatore F. Aiello, Racine, Wis., assignor to Loed Corporation, Wausau, Wis.
Filed Oct. 30, 1972, Ser. No. 302,137
Term of patent 14 years
Int. Cl. D15—*04*
U.S. Cl. D60—1



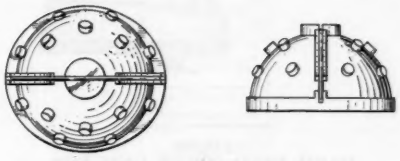
235,375
LASER GRADING TRANSIT OR THE LIKE
J. Peter E. Kooi, Succasunna, and Allister L. Baker, Denville, N.J., assignors to Keuffel & Esser Company, Morristown, N.J.
Filed Aug. 17, 1973, Ser. No. 389,074
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—66



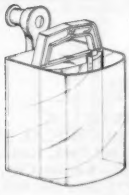
235,376
VERTICALLY ADJUSTABLE SEWING MACHINE CABINET
Robert S. Peets, Watchung, N.J., assignor to The Singer Company
Filed No. 12, 1973, Ser. No. 415,283
Term of patent 14 years
Int. Cl. D15—*06*
U.S .Cl. D70—1

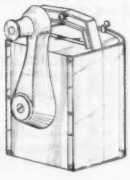


235,377
ACETABULAR CUP
Samuel Medcraft, 6 Barnfield Road, Swindon, England
Filed Mar. 23, 1973, Ser. No. 344,281
Claims priority, application Great Britain Jan. 24, 1973
Term of patent 7 years
Int. Cl. D24—*99*
U.S. Cl. D83—1 E

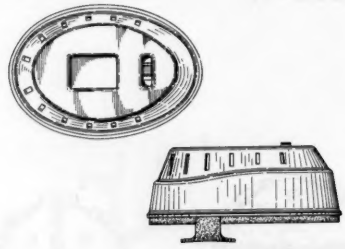


235,378
PRESSURE BLOOD INFUSER
Joseph E. Mason, Melville, N.Y., assignor to New Dimensions Research Corporation, Old Bethpage, N.Y.
Filed May 25, 1973, Ser. No. 363,862
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D83—1 F

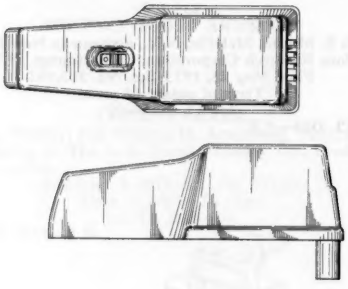




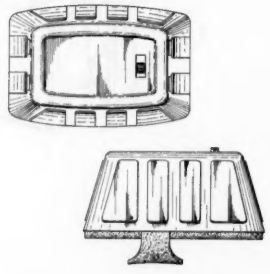
235,379
HAND MOUNTED ELECTRICAL MASSAGER
Samuel L. McNair, Overland Park, Kans., assignor to Dazey Products Co., Kansas City, Mo.
Filed Aug. 28, 1973, Ser. No. 392,260
Term of patent 14 years
Int. Cl. D28—*03;* D24—*99*
U.S. Cl. D83—1 T



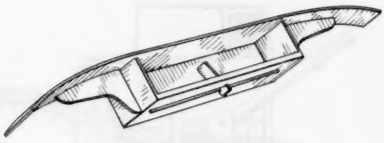
235,380
HAND HELD POWER UNIT FOR MASSAGING DEVICES
Samuel L. McNair, Overland Park, Kans., assignor to Dazey Products Co., Kansas City, Mo.
Filed Aug. 28, 1973, Ser. No. 392,261
Term of patent 14 years
Int. Cl. D28—*03;* D24—*99*
U.S. Cl. D83—1 T



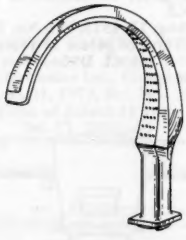
235,381
HAND SUPPORTED ELECTRICAL MASSAGER
Samuel L. McNair, Overland Park, Kans., assignor to Dazey Products Co., Kansas City, Mo.
Filed Oct. 24, 1973, Ser. No. 409,280
Term of patent 14 years
Int. Cl. D28—*03;* D24—*99*
U.S. Cl. D83—1 T



235,382
TAPE STORAGE RACK
Robert P. McInnes, 1108 Fairway Drive, Linden, Mich. 48451
Filed Feb. 26, 1973, Ser. No. 335,529
Term of patent 14 years
Int. Cl. D3—*99*
U.S. Cl. D87—1 D



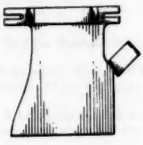
235,383
HAIR DRYING ATTACHMENT
Samuel L. McNair, Overland Park, Kans., assignor to Dazey Products Co., Kansas City, Mo.
Filed Nov. 19, 1973, Ser. No. 416,749
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D86—10 F



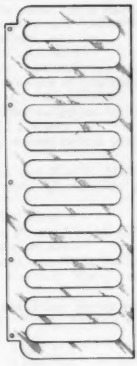
235,384
DUFFEL BAG
Dorothy M. Theilkas, 2046 W. Windsor Ave. Phoenix, Ariz. 85009
Filed May 23, 1973, Ser. No. 362,889
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—5 G

235,385
KEY HOLDER
James A. Smyth, R.D. 1,
Wilcox, Pa. 15870
Filed June 14, 1973, Ser. No. 369,813
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—8

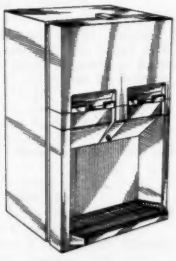
235,386
UMBRELLA RUNNER WITH LEVER
Heinz Weber, Hilden, Germany, assignor to Telesco Brophey Limited, Montreal, Quebec, Canada
Continuation of abandoned design application Ser. No. 24,599, Aug. 20, 1970. This application Aug. 10, 1971, Ser. No. 170,676
Claims priority, application Germany Feb. 20, 1970
Term of patent 14 years
Int. Cl. D3—*03*
U.S. Cl. D88—3 A



235,387
SAFETY SHIELD FOR A TEXTILE COMBING MACHINE
Philip B. Tarbox, Clemson, and Carey A. Glazener, Easley, S.C., assignors to Maremont Corporation
Filed Jan. 18, 1973, Ser. No. 324,883
Term of patent 14 years
Int. Cl. D15—*06*
U.S. Cl. D92—15



235,388
COMBINED BEVERAGE COOLER AND DISPENSER
William Taylor, Columbus, Ohio, assignor to Ebco Manufacturing Company, Columbus, Ohio
Filed Nov. 2, 1973, Ser. No. 412,448
Term of patent 14 years
Int. Cl. D15—*08*
U.S. Cl. D94—3 B



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 10TH DAY OF JUNE, 1975

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. O. Smith-Inland, Inc.: *See*—
Fiser, James T.; Jackman, Robert M.; and James, Ray R., 3,888,714.

A.P.V. Company Limited, The: *See*—
Starkie, Granville Lewis, 3,888,167.

A.R.D. Anstalt: *See*—
Gabr, Saad Zaghoul Mohamed, 3,889,058.

A. Schild S.A.: *See*—
Zaugg, Roland; and Fluck, Josef, 3,888,076.

AB Motala Verkstad: *See*—
Wessman, Bo Henry, 3,889,078.

Abe, Hidetoshi: *See*—
Toriyama, Kazuhisa; Nakano, Fumio; Sato, Mikio; Abe, Hidetoshi; and Kanazaki, Mikio, 3,888,566.

Abel, Leon A.: *See*—
Tosato, Lawrence; Abel, Leon A.; and Mullis, Clyde M., 3,889,231.

Abele, Werner; and Schneider, Rudolf, to du Pont de Nemours, E. I., and Company. Silver halide photographic material containing antifog agent with protected mercapto group. 3,888,677, Cl. 96-76.00R.

Abramitis, Walter W., to Akzona Incorporated. Tobacco sucker control. 3,888,654, Cl. 71-78.000.

ACME Electric Corporation: *See*—
Randall, Ronald Harold, 3,889,176.

Action Communication Systems, Inc.: *See*—
Epstein, Barry M., 3,889,062.

Adams, Carl: *See*—
Adams, Edward, Jr.; Adams, Carl; and Adams, Ronald, 3,888,481.

Adams, David O., Jr.; and Skaggs, John H., to AMF Incorporated. Verification means for shear wave ultrasonic inspection system. 3,888,114, Cl. 73-67.80R.

Adams, Edward, Jr.; Adams, Carl; and Adams, Ronald. Training and practicing apparatus for wrestling. 3,888,481, Cl. 272-83.00R.

Adams, Ronald: *See*—
Adams, Edward, Jr.; Adams, Carl; and Adams, Ronald, 3,888,481.

Adickes, Fred; Livesey, James R.; Weir, George; Bailey, Dennis; and Mehelich, John J., to Wolverine Toy Company. Bowling game. 3,888,483, Cl. 273-38.000.

Admiral Corporation: *See*—
Bagwe, Suhas Prataprao, 3,889,194.

Aerjet-General Corporation: *See*—
Eggington, Wilfred J.; and Douglas, Owen, 3,888,330.

Aero Industries, Inc.: *See*—
Smith, Philip L., 3,889,104.

African Explosives and Chemical Industries Limited: *See*—
Hughes, David Owen, 3,888,792.

Agfa-Gevaert Aktiengesellschaft: *See*—
Freytag, Karl-Heinz; Meyer, Rudolf; and Hoffman, Klaus, 3,889,271.
Hoffmann, Klaus; Konig, Hans-Dieter; and Meyer, Rudolf, 3,889,270.
Kisselmann, Willy; Rumpelein, Fritz; and Kopf, Paul, 3,889,187.
Meyer, Rudolf; Hoffmann, Klaus; Freytag, Karl-Heinz; and Vetter, Hans, 3,889,269.

Ahlen, Karl Gustav, to S.R.M. Hydromekanik Aktiebolag. Modulating arrangement for servo-motor actuated disc brake. 3,888,141, Cl. 74-730.000.

Ahrens, Claude W. Stair unit for a stairway. 3,888,058, Cl. 52-191.000.

Ajinomoto Co., Inc.: *See*—
Ishizaki, Ayaaki; Morinaga, Yasushi; Sakakibara, Hiroyuki; and Horiuchi, Masao, 3,888,740.

Akiyama, Masanori: *See*—
Suzuki, Takeshi; Takenaka, Shigeo; Tanaka, Hiroshi; and Akiyama, Masanori, 3,888,673.

Akiyama, Taichiro. Drain for the eardrum and apparatus for introducing the same. 3,888,258, Cl. 128-305.000.

Akiyoshi, Katsumi; Terui, Yukimasa; Kirigaya, Hitoshi; and Koyama, Haruo, to Bridgestone Tire Company Ltd. Method for producing fiberglass reinforced plastic composite pipes. 3,888,712, Cl. 156-171.000.

Akturk, Nuri Uygun; and Ashdown, Ronald Arthur, to Foster Wheeler Corporation. Boilers. 3,888,213, Cl. 122-478.000.

Akzo N.V.: *See*—
Brouwer, Anton H. J., 3,889,010.

Akzona Incorporated: *See*—
Abramitis, Walter W., 3,888,654.

Albin, Max D., to Koehring Company. Mobile concrete batch plant and dual shiftable mobile mixers therefor. 3,888,468, Cl. 259-171.000.

Alcan Research and Development Limited: *See*—
Williams, Merlyn Morris, 3,888,621.

Alderfer, Sterling W., to Steelastic Company, The. Method for producing reinforced fabric. 3,888,713, Cl. 156-93.000.

Alderman, Albert D., Jr.; and Cherian, Gabriel B., to Sperry Rand Corporation. Sheet limiter. 3,888,478, Cl. 271-8.00R.

Alferness, Merwin H.; and Miller, John A., to Sperry Rand Corporation. Common storage controller for dual processor system. 3,889,237, Cl. 340-172.500.

Allcock, Harry Rex, to Firestone Tire & Rubber Company, The. Preparation of phosphazene polymers. 3,888,800, Cl. 260-2.00P.

Allegheny Ludlum Industries, Inc.: *See*—
Ferree, Joseph A., Jr., 3,888,659.

Allen, George Rodger, Jr.; and McEvoy, Francis Joseph, to American Cyanamid Company. Process of preparing 3-alkyl-3-(benzoyl)propionitriles. 3,888,901, Cl. 260-465.00R.

Allen, Jeral D., to Watertite Industries, Inc. Metal stud and track former. 3,888,099, Cl. 72-129.000.

Allen, John A. Poultry raising system and process. 3,888,211, Cl. 119-18.000.

Allen, William Douglas; and Morris, Michael, to United Kingdom Atomic Energy Authority. Electrostatic generator. 3,889,138, Cl. 310-6.000.

Allergan Pharmaceuticals: *See*—
Boghosian, Malcolm P.; and Blanco, Milagros V., 3,888,782.

Allied Chemical Corporation: *See*—
Crescentini, Lamberto; and Wells, Rodney Lee, 3,888,944.
Dench, John E.; Knutson, Harry; and Seven, Manfred K., 3,888,911.
Evans, Francis E.; and Gilleo, Kenneth B., 3,888,819.
Gilleo, Kenneth B.; Evans, Francis E.; and Sogn, Allen W., 3,888,822.
Hamilton, Brian K., 3,888,503.
Mears, Whitney H., 3,889,042.
Schevey, William Russell; Jones, Harold Freeman; and Spielman, Burton A., 3,888,693.
Stephenson, Robert L., 3,888,541.

Allison, Cecil J., Jr.: *See*—
Fraser, Richard S.; Allison, Cecil J., Jr.; Caster, Richard W.; McConnel, Ronald J.; Kribich, Roland E.; and Jone, Paul Y., 3,888,715.

Alliston, William H.; and Johnson, Steven J., to Westinghouse Electric Corporation. Method and system for nuclear power plant synchroscope simulation for operator training. 3,889,106, Cl. 235-151.210.

Allmanna Svenska Elektriska Aktiebolaget: *See*—
Berglund, Ake; Suvanto, Antti; and Tornblom, Lars, 3,888,732.

Alsup, James M., to United States of America, Navy. Acoustic devices for time-multiplexed communication. 3,889,065, Cl. 179-15.0BC.

Alt, Gerhard H., to Monsanto Company. N-nitroso-N-phosphonomethyl glycine compounds and herbicidal use thereof. 3,888,915, Cl. 260-501.210.

Alza Corporation: *See*—
Higuchi, Takeru; and Uekama, Kaneto, 3,888,848.
Ramwell, Peter W., 3,888,975.

Amano, Hisao: *See*—
Isogai, Tokio; Isikawa, Eiichi; Fukushi, Keiji; Amano, Hisao; Ogata, Fumio; and Ikemoto, Norio, 3,889,175.

Amano, Tadashi; and Andoh, Ryuichi, to Konishiroku Photo Industry Co., Ltd. Process of and system for printing in color photography. 3,888,580, Cl. 355-38.000.

Amchem Products, Inc.: *See*—
Rodzewich, Edward A., 3,888,783.

Amer-O-Matic Corporation: *See*—
Pierce, Edwin F.; Roberts, Larry W.; and Maddox, Leland D., 3,888,069.

Amerace Corporation: *See*—
Basile, Peter A., 3,888,064.
Mazzeo, Charles F.; and Santos, Anthony J., 3,887,981.

American Bank Note Company: *See*—
D'Amato, Salvatore F.; and Foote, Chauncey P., Jr., 3,888,172.

American Chain Cable Company, Inc.: *See*—
Hess, Daniel E.; and Bannier, David William, 3,888,290.

American Cyanamid Company: *See*—
Allen, George Rodger, Jr.; and McEvoy, Francis Joseph, 3,888,901.
Chao, Tsai Hsiang, 3,888,779.
Haacke, Gottfried Christian; and Tracey, Donald John, Jr., 3,888,565.
Maulding, Donald Roy, 3,888,786.
Schurdak, Edward Joseph, 3,888,825.

American Home Products Corporation: *See*—
Failli, Amedeo; Nelson, Verner R.; Immer, Hans U.; and Gotz, Manfred K., 3,888,840.
Jirkovsky, Ivo L., 3,888,887.
Revesz, Clara, 3,888,981.
Sellstedt, John H.; Guinosso, Charles J.; and Bell, Stanley C., 3,888,858.

American Hospital Supply Corporation: *See*—
Lake, Charles C.; and Jaremus, Boubene M., 3,888,008.
Yindra, Leonard J.; and Karl, Robert A., 3,888,444.

American Motors Corporation: *See*—
Laforet, Henry A.; and Zusack, Michael J., 3,888,293.

American Optical Corporation: *See—*
Shoemaker, Arthur H., 3,888,567.
American Waagner-Bird Company Inc.: *See—*
Kemmetmueller, Roland, 3,888,742.
Ames, Robert G., to Ulysses Stanley Ames. Recess filling mastic applicator having four point contact with surface and novel tool-steering means. 3,888,611, Cl. 425-87.000.
Amex Systems, Inc.: *See—*
Oberdiear, Robert C., 3,889,046.
AMF Incorporated: *See—*
Adams, David O., Jr.; and Skaggs, John H., 3,888,114.
Hollenton, Frank; and Park, William P., 3,888,262.
Ammco Tools, Inc.: *See—*
Mitchell, Wallace F., 3,888,128.
AMP Incorporated: *See—*
Fendrich, Charles Nelson, Jr., 3,889,177.
Frantz, Robert Houston, 3,888,063.
Geib, R. Larry, 3,888,559.
Graeff, Norwood Claude, 3,889,087.
Hammell, Kemper Martel, 3,889,216.
Lockard, Joseph Larue, 3,888,807.
Lockard, Joseph LaRue, 3,889,085.
AMSTED Industries Incorporated: *See—*
Jeffreys, Lyman Wood, 3,888,453.
Amundsen, Joseph; Wetzel, William H.; Naimy, Norma; and Goodwin, Robert J., to Reichhold Chemicals, Inc. Method for treating wood. 3,889,020, Cl. 427-297.000.
Anaconda Company, The: *See—*
Arnaudin, Edwin H., Jr.; Christiansen, Wilbert W.; and Hazelett, Robert I., Jr., 3,888,718.
Anchor Hocking Corporation: *See—*
Frey, Raymond C., 3,888,348.
Andco Incorporated: *See—*
Fritz, Jack J.; and Lucas, Theodore W., Jr., 3,888,632.
Anderson, Clarence A. F.; and Laird, Robert A., to Shaw-Walker Company. Insulated inner container for a fire resistant file cabinet. 3,888,557, Cl. 312-214.000.
Anderson, E. Eugene: *See—*
McCullough, Edward E.; and Anderson, E. Eugene, 3,888,419.
Anderson, Edward J. Hanger assembly for attaching a form to a structural beam. 3,888,452, Cl. 249-23.000.
Anderson, Hyrum T.: *See—*
Jentzsch, David P.; Anderson, Hyrum T.; and Olsen, Lee J., 3,888,186.
Anderson, James J.; and Camacho, Vasco G., to Mobil Oil Corporation. Preparation of tris (2-chloroethyl) phosphite. 3,888,953, Cl. 260-977.000.
Anderson, Paul L., to Sandoz, Inc. 4-Hydroxyethyl-biphenylyl-butadienols. 3,888,933, Cl. 260-618.00R.
Anderson, Paul L., to Sandoz, Inc. Biphenylene-substituted-butadienols. 3,888,934, Cl. 260-618.00F.
Anderson, Richard S.; Crafts, Robert L.; Murphy, John A.; Patterson, Irvin L.; and Schultz, Harold P., to Midwestern Instruments, Inc. Means for recording multi-bit character data. 3,889,294, Cl. 360-52.000.
Anderson, Tage O.: *See—*
United States of America, National Aeronautics and Space Administration; and Anderson, Tage O., 3,889,064.
Andersson, Per-Erik; and Horntvedt, Einar, to Svenska Cellulosa Aktiebolaget. Method and apparatus for oxidizing sulphide-containing aqueous solutions. 3,888,967, Cl. 423-206.000.
Ando, Reijiro; and Iwai, Shigeru, to Kabushiki Kaisha Daini Seikosha. Industrial robot. 3,888,360, Cl. 214-1.0BB.
Ando, Takuji: *See—*
Mizuno, Kimio; Ando, Takuji; Tsujino, Masatoshi; Takada, Masaki; Yoshizawa, Munetoshi; Matsuda, Tetsuo; and Hayashi, Mitsuo, 3,888,843.
Andoh, Ryuichi: *See—*
Amano, Tadashi; and Andoh, Ryuichi, 3,888,580.
Anheuser-Busch, Incorporated: *See—*
Newell, Jon Albert; Seeley, Robert Dudley; and Robbins, Ernest Aleck, 3,888,839.
Anthony, Andy J.: *See—*
Finch, Lester M.; and Anthony, Andy J., 3,888,731.
Appleton Electric Company: *See—*
Artzer, Paul J., 3,888,723.
Applied Inventions Corporation: *See—*
Kehler, Paul, 3,888,322.
Arden, Richard J.; and Schweriner, Harold A., to Simco Company, Inc., The. Contact printing apparatus with electrostatic hold-down. 3,888,586, Cl. 355-78.000.
Arey, William F., Jr.; and Sawyer, Willard H., to Exxon Research and Engineering Company. Rare earth chrysotile catalysts. 3,888,793, Cl. 252-454.000.
Ariga, Kazuo: *See—*
Teshima, Toru; Nagasao, Toshiie; Tanaka, Minoru; Ariga, Kazuo; and Inoue, Kiyoshi, 3,888,756.
Armbrust, William D.: *See—*
Fawcett, William E.; and Armbrust, William D., 3,889,093.
Armco Steel Corporation: *See—*
Tanczyn, Harry, 3,888,119.
Armstrong Rubber Company, The: *See—*
Herzlich, Harold J.; and Fitzgerald, Paul F., 3,888,291.
Arnaudin, Edwin H., Jr.; Christiansen, Wilbert W.; and Hazelett, Robert I., Jr., to Anaconda Company, The. Apparatus for applying a dual extrusion over a cable conductor. 3,888,718, Cl. 156-356.000.
Arndt, Peter Joseph; Pennewiss, Horst; Plainer, Hermann; Krall, Wilhelm; Masanek, Juergen; and Mueller, Manfred, to Rohm GmbH. Method for preparing polymers in solid particulate form. 3,888,945, Cl. 260-876.00R.
Arneson, Steven H.: *See—*
Burnsweig, Joseph; and Arneson, Steven H., 3,889,212.
Arpe, Hans-Jurgen, to Hoechst Aktiengesellschaft. Process for the preparation of pivalolactone. 3,888,884, Cl. 260-343.900.
Arrandale, Roy S.; Walding, Wayne A.; and Daugherty, Barney R., to Dart Industries Inc. Method of coating glass article and improved coated glassware product. 3,889,030, Cl. 428-215.000.
Arthur D. Little, Inc.: *See—*
Fowler, John T., 3,888,016.
Pars, Harry G.; and Razdan, Raj K., 3,888,946.
Artzer, Paul J., to Appleton Electric Company. Machine for assembling a gasket assembly. 3,888,723, Cl. 156-499.000.
Arya, Manohar L., to Warwick Electronics Inc. Double tuned retrace driven horizontal deflection circuit. 3,889,156, Cl. 315-408.000.
Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
Isuge, Masami; Uematsu, Shinichi; Ono, Yotsuo; Eiga, Shokichi; and Makita, Minoru, 3,888,771.
Asanari, Shigeyuki: *See—*
Yoshikawa, Hiromi; Sawada, Katsuo; Asanari, Shigeyuki; Kajikawa, Saburo; and Kodama, Takao, 3,888,643.
Ashcraft, Thomas L., Jr.: *See—*
Gale, Walter W.; Ashcraft, Thomas L., Jr.; and Saunders, Rhoderick K., 3,888,308.
Ashdown, Ronald Arthur: *See—*
Akturk, Nuri Uygun; and Ashdown, Ronald Arthur, 3,888,213.
Ashton, George. Container filler apparatus. 3,888,285, Cl. 141-168.000.
Asinger, Friedrich; Gluzek, Karl-Heinz; and Offermanns, Heribert, to Deutsche Gold-und Silber-Scheideanstalt vormals Roessler. Process of making penicillamine. 3,888,923, Cl. 260-534.00S.
Asselman, George Albert Apolonia; and Dirne, Adrianus Petrus, to U.S. Philips Corporation. Electric soldering iron delivering heat by change of state of a liquid heat transporting medium. 3,889,096, Cl. 219-229.000.
Assmus, Ulf E.; Bartel, Willy; and Hessenmuller, Horst, to Siemens Aktiengesellschaft. Method of safeguarding the transmission of the continuous polarity in data transmission systems transferring a polarity reversal in coded form. 3,889,235, Cl. 340-146.10R.
Astrosystems Inc.: *See—*
Mayer, Arthur, 3,889,206.
Atlantic Richfield Company: *See—*
Grosboll, Martin P.; and Edison, Robert R., 3,888,633.
Kasberg, Alvin H., 3,888,794.
Kasberg, Alvin H., 3,888,795.
Zenon, Raymond A., 3,887,985.
Atomic Energy of Canada Limited: *See—*
Stevens, William H., 3,888,974.
Atsukawa, Masumi; Shinoda, Naoharu; and Kuwubara, Haruo, to Mitsubishi Jukogyo Kabushiki Kaisha. Method of separating impurities for removal in desulfurization of effluent gas in a wet lime-gypsum process. 3,888,968, Cl. 423-242.000.
Audichron Company, The: *See—*
Walker, Walter P., 3,889,291.
Aukerlund, Albin M.: *See—*
Cox, Charles H., III; and Aukerlund, Albin M., 3,889,252.
Ault, Cyrus Frank, to Bell Telephone Laboratories, Incorporated. Line supervisory circuit. 3,889,069, Cl. 179-18.00F.
Aumayer, Hansruedi: *See—*
Guaglione, Giovanni Paolo; McCloud, James R.; and Aumayer, Hansruedi, 3,889,083.
Automatic Braiding Co. (Nottingham) Ltd.: *See—*
Lynam, John Edward, 3,887,968.
Automatisme et Technique: *See—*
Bardet, Gerard, 3,888,299.
Automobiles Peugeot: *See—*
Larsonneur, Jean-Francois, 3,888,085.
Avco Everett Research Laboratory, Inc.: *See—*
Itzkan, Irving, 3,889,208.
Avital, Shlomo; Silbermann, Menahem; and Elson, David. Plural-sample filter device. 3,888,770, Cl. 210-238.000.
Avital, Shlomo: *See—*
Elson, David; and Avital, Shlomo, 3,888,759.
Awano, Tsuneo: *See—*
Onishi, Kazutoshi; Awano, Tsuneo; and Masuzawa, Isao, 3,889,168.
Ayers, Earl D.: *See—*
Langer, Horst G.; and Ayers, Earl D., 3,888,107.
Ayerst McKenna and Harrison Ltd.: *See—*
Immer, Hans U.; Nelson, Verner R.; and Gotz, Manfred K., 3,888,838.
Lippmann, Wilbur, 3,888,985.
Lippmann, Wilbur, 3,888,991.
Azzarello, Joseph A.; and Di Vita, Fosco L., to International Harvester Company. Tractor hitch sway limiting device. 3,888,316, Cl. 172-450.000.
B. V. Nederlandse Kraanbouw Maatschappij: *See—*
Roukema, Johannes; and Noordegraaf, Frederik, 3,888,757.
Babcock-Hitachi K.K.: *See—*
Kishigami, Kunio; Kobayashi, Hiroshi; and Oshima, Shigenobu, 3,888,193.
Kishigami, Kunio; Kobayashi, Hiroshi; Sente, Toru; and Sugiyama, Koichi, 3,888,194.

Babcock Wilcox Company, The: *See*—
Juric, Slavko I., 3,888,734.

Bachmann, Peter, to Ebauches Bettlach S.A. Mechanical watch movement. 3,888,077, Cl. 58-59.000.

Bachner, Ernst: *See*—
Fastner, Thorwald; Niedermayr, Alois; and Bachner, Ernst, 3,888,294.

Back, Frank G. Navigation and surveillance system. 3,889,052, Cl. 178-6.000.

Baclit, Paul S. Combined cigarette package holder and ashtray compartment. 3,888,264, Cl. 131-235.00R.

Bacso, Imre, to Sandoz, Inc. 17α-substituted-allene-bearing steroids. 3,888,849, Cl. 260-239.500.

Bader, Henry; and Rickter, Donald O., to Polaroid Corporation. Novel processes for photographic products. 3,888,875, Cl. 260-314.500.

Bader, Henry; and Boag, Alexander, to Polaroid Corporation. Novel processes for photographic products. 3,888,876, Cl. 260-314.500.

Badische Anilin- Soda-Fabrik Aktiengesellschaft: *See*—
Fischer, Adolf, 3,888,655.

Baermann, Max, to Max Baermann, Firma. Induction brake or clutch. 3,889,140, Cl. 310-103.000.

Baetz, Jacques L. E., to Seperic. Derivatives of thiazolino-pyrimidin-6-ones, in inducing analgesia. 3,888,983, Cl. 424-251.000.

Bagozzi, Ottaviano Clerici. Apparatus for loading a magnetic tape into a cassette. 3,888,480, Cl. 242-56.00R.

Bagshawe, Kenneth Dawson. Performance of chemical or biological reactions within an absorbent matrix pad. 3,888,629, Cl. 23-230.00B.

Bagwe, Suhas Prataprao, to Admiral Corporation. Television tuner to reduce harmonic radiation interference. 3,889,194, Cl. 325-436.000.

Bagwell, Dennis P., to Tomorrow Enterprises, Inc. Cutting tool. 3,888,005, Cl. 30-286.000.

Bahren, Walter: *See*—
Lenards, Gerhard; and Bahren, Walter, 3,889,034.

Bailey, Dennis: *See*—
Adickes, Fred; Livesey, James R.; Weir, George; Bailey, Dennis; and Mehelich, John J., 3,888,483.

Bailey, William J., Jr.; Houle, James F.; and Van Norman, Gilden R., to Eastman Kodak Company. Method for adjusting triboelectric charging characteristics of materials. 3,888,678, Cl. 96-87.00A.

Bain, Peter James Stratford; and McCall, Ernest Bryson, to Monsanto Chemicals Limited. Thermally reversible polymer compositions prepared from polyisothiocyanates. 3,888,964, Cl. 264-236.000.

Bala, Mitchell J.: *See*—
Blecherman, Sol S.; Bala, Mitchell J.; Evans, Dennis J.; and Ulion, Nicholas E., 3,889,019.

Balass, Valentin: *See*—
Gertsch, Ulrich; and Balass, Valentin, 3,888,498.

Balatoni, Julius A.: *See*—
Pande, Gyan S.; and Balatoni, Julius A., 3,888,878.

Balding, John V.: *See*—
Cieslak, Richard F.; and Balding, John V., 3,889,256.

Bamberger, George D.: *See*—
Starrett, Herman P.; and Bamberger, George D., 3,888,482.

Bank Computer Network Corporation: *See*—
Fish, Leonard A., 3,888,433.

Banner Metals Division Intercole Automation, Inc.: *See*—
Folberth, Fred G., 3,888,379.

Bannier, David William: *See*—
Hess, Daniel E.; and Bannier, David William, 3,888,290.

Bardet, Gerard, to Automatisme et Technique. Machine for the production of foundry cores and moulds. 3,888,299, Cl. 164-228.000.

Barnett, Louis H. Apparatus for forming multiple passageway conduit. 3,888,617, Cl. 425-296.000.

Barrows, Franklin H.: *See*—
Hunter, Byron A.; and Barrows, Franklin H., 3,888,801.

Bartel, Willy: *See*—
Assmus, Ulf E.; Bartel, Willy; and Hessenmuller, Horst, 3,889,235.

Bartholomew, Donald D., to Merit Plastics, Inc. Non-threaded tubing connector. 3,888,523, Cl. 285-382.000.

Bartko, John: *See*—
Tarneja, Krishan S.; and Bartko, John, 3,888,701.

Barton, Glen B. Adjustable angle double cutting mitre cut-off saw. 3,888,152, Cl. 83-471.300.

Barton, Glen B. Variable degree vice. 3,888,476, Cl. 269-41.000.

Bartram, James F., to Dewey Electronics Corporation, The. Multiple correlation method and apparatus for measuring and summing time differences. 3,889,266, Cl. 343-112.00R.

Basey, Otis, to Cosco, Inc. Cart-leg connection. 3,888,192, Cl. 108-156.000.

BASF Aktiengesellschaft: *See*—
Holl, Norbert, 3,888,608.

Basham, Jack K., to TRW Inc. Tunnel diode digital data sample, decision and hold circuit. 3,889,134, Cl. 307-268.000.

Bashark, Larry Thomas, to Whirlpool Corporation. Control system for dishwasher. 3,888,269, Cl. 134-57.00D.

Basile, Peter A., to Amerace Corporation. Multiple grip length mounting bolt. 3,888,064, Cl. 52-758.00F.

Bass, John M. Electronic hazard tester for medical facilities. 3,889,184, Cl. 324-62.000.

Bass, Merlyn Duane; and Gerhardt, Ralph August, to Deere & Company. Method of loading agricultural machines on a railroad. 3,888,189, Cl. 105-367.00R.

Bastian, Jean-Michel; and Hasspacher, Klaus, to Sandoz, Inc. N,N'-bis[3-hydroxy-2-(3,4-dihydroxy-phenyl)-1-propyl]-aliphatic-diamines. 3,888,829, Cl. 260-570.600.

Battaerd, Hendrik Adriaan Jacobus: *See*—
Willis, Donald; Battaerd, Hendrik Adriaan Jacobus; Lang, Gunter Anton; and Weiss, Donald Eric, 3,888,928.

Battarel, Claude, to Techniques et Systemes Informatiques. Propagation register for magnetic domains. 3,889,246, Cl. 340-174.0ZB.

Battelle Development Corporation: *See*—
Hildebrand, Bernard P., 3,889,226.

Battle Creek Equipment Company: *See*—
Woods, Thomas G., 3,889,101.

Bauch, Ernst, to Neumunstersche Maschinen-und Apparatebau Ges. mbH. Crimping of synthetic plastic filaments. 3,887,972, Cl. 28-1.400.

Baudermann, Adolf, to Cross Europa-Werk GmbH. Cutting process and device for producing parallel-flanked grooves. 3,888,161, Cl. 90-11.00C.

Bauer, Andreas: *See*—
Protze, Dieter; and Bauer, Andreas, 3,888,540.

Bauer, Herbert: *See*—
Schiebelhuth, Heinz; and Bauer, Herbert, 3,889,192.

Bauer, Ralph L.; and Simpson, Fred E., to Caterpillar Tractor Co. Swing bearing with bolt-on segmented gear. 3,888,357, Cl. 212-68.000.

Bauer, Wilhelm; and Stahlschmitt, Horst, to Pfaff Industriemaschinen GmbH. Thread cutter device on chain stitch sewing machine. 3,888,198, Cl. 112-252.000.

Baumann, Hans-Peter; and Keller, Robert-Christian, to Sandoz, Inc. Novel cyclic sulphones and derivatives thereof. 3,888,913, Cl. 260-501.190.

Baxter Laboratories, Inc.: *See*—
Miranda, Eduardo V., 3,888,113.

Bayer Aktiengesellschaft: *See*—
Hoffmann, Hellmut; Hammann, Ingeborg; and Homeyer, Bernhard, 3,888,951.
Wank, Joachim; Reese, Eckart; Rohrbach, Josef; and Bruck, Rolf, 3,889,040.

Bayer, Horst O.; Swithenbank, Colin; and Yih, Roy Y., to Rohm and Haas Company. Herbicidal 4-trifluoromethyl-4-nitrodiphenyl ethers. 3,888,932, Cl. 260-612.00R.

Beatrice Foods Co.: *See*—
Chow, Ho, 3,888,421.

Beaver-Advance Corporation: *See*—
Morris, Ronald G., 3,888,595.

Bechtold, James H.: *See*—
Shoupp, William E.; and Bechtold, James H., 3,888,658.

Becker, John L.; Hohnecker, Otto; and Dunne, Maurice J., to Unimation, Inc. Programmed manipulator arrangement for continuously moving conveyor. 3,888,361, Cl. 214-1.0BH.

Beckerer, Frank S.; and Beckerer, Frank S., Jr. Cutting apparatus for strip stock. 3,888,151, Cl. 83-411.00A.

Beckerer, Frank S., Jr.: *See*—
Beckerer, Frank S.; and Beckerer, Frank S., Jr., 3,888,151.

Beckwith, Merton; and Hsu, Grace F. Bright dip composition for tin/-lead. 3,888,778, Cl. 252-79.300.

Becton, Dickinson and Company: *See*—
Hill, John B., 3,888,250.

Bedzyk, Victor Lee: *See*—
Perreault, Donald A.; Bedzyk, Victor Lee; Matthews, Larry Richard; Rivers, Roy Wilben; Shuey, David Rolling; and Torpie, John David, 3,889,057.

Beecham Group Limited: *See*—
Watt, Peter Ridgway; and Wilkinson, Harold George, 3,888,253.

Beer, Heinz: *See*—
Olsen, Willi; Lorenz, Dieter; and Beer, Heinz, 3,889,076.

Bell & Howell Co.: *See*—
Corrigan, Richard A., 3,888,675.
Gaynor, Joseph, 3,888,174.

Bell, Lon E., to Technar Incorporated. Sensor assembly for use in a vehicle equipped with a gas bag restraint system. 3,889,232, Cl. 340-52.00H.

Bell, Stanley C.: *See*—
Sellstedt, John H.; Guinosso, Charles J.; and Bell, Stanley C., 3,888,858.

Bell Telephone Laboratories, Incorporated: *See*—
Ault, Cyrus Frank, 3,889,069.
Dellecker, Raymond Whyte, 3,889,068.
Duff, Thomas Guy, 3,889,197.
Heisinger, Robert Frederick, 3,889,221.
Hoppough, Richard Scott; and Walker, Herbert Bryant, 3,889,073.
Lou, David Yuan Kong; and Willens, Ronald Howard, 3,889,272.

Bellina, Russell Frank, to du Pont de Nemours, E. I., and Company. n-Alkoxy-n-alkylamino substituted dithiazolium salts. 3,888,872, Cl. 260-306.80R.

Belthle, Heinz, to Fortuna Werke Maschinenfabrik AG. Control of the motion of a work tool carriage. 3,888,051, Cl. 51-165.770.

Bencini, Roberto. Mechanism for speed reduction and stopping the film drive for use in cinematographic projectors. 3,888,574, Cl. 352-194.000.

Bendix Corporation, The: *See*—
Moss, James R., 3,889,111.

Bennett, Clarence L., Jr.; De Lorenzo, Joseph D.; and Durling, Hubert P., Jr., to Sperry Rand Corporation. Static magnetic field metal detector. 3,889,249, Cl. 340-258.00R.

Bennett, John D., to Sun Oil Company. System for chipping and moving ice. 3,888,544, Cl. 299-25.000.

Benoit, Lucien E. Device for determining the position and outline of openings to be made in sheet materials. 3,888,013, Cl. 33-174.00G.

Berghausen, Jakob, to International Harvester Company. Vehicle ballast weight assembly. 3,888,507, Cl. 280-150.00E.

Berglund, Ake; Suvanto, Antti; and Tornblom, Lars, to Allmanna Svenska Elektriska Aktiebolaget. Inlet for fuel assembly having finger control rods. 3,888,732, Cl. 176-50.000.

Bergsland, Jon, to Oivind Lorentzen Activities, Inc. Foundation wall protective sheet. 3,888,087, Cl. 61-11.000.

Bergwerksverband GmbH: *See*—
Juntgen, Harald; Knoblauch, Karl; and Zundorf, Dieter, 3,888,958.

Beriger, Ernst, to Ciba-Geigy Corporation. Control of pests with O-ethyl-S-(N)-propyl-S-carbamoylalkyl dithiophosphates. 3,888,979, Cl. 424-211.000.

Berkley & Company, Inc.: *See*—
Warthen, Raymond L., 3,888,037.

Berkowitz, Sidney, to FMC Corporation. Preparation of low bulk density sodium dichloroisocyanurate dihydrate. 3,888,855, Cl. 260-248.00C.

Bernard, Harvey B.; and Dolle, Karl H., to Bernard, Harvey B. Electronic chess board and display system. 3,888,491, Cl. 273-136.00A.

Berntson, E. Boyd; and Lemmons, Douglas. Weighted surgical belt. 3,888,245, Cl. 128-78.000.

Berry, Ronald: *See*—
Tiernan, Stanley C.; and Berry, Ronald, 3,888,284.

Bert, Silas E., to du Pont de Nemours, E. I., and Company. Toggle crimper. 3,888,105, Cl. 72-410.000.

Bessmer, Stanley J.; and Lampe, Warren R., to General Electric Company. Self-bonding two-package room temperature vulcanizable silicone rubber compositions. 3,888,815, Cl. 260-37.0SB.

BFG Glassgroup: *See*—
Groth, Rolf, 3,889,026.

Biber, Conrad H., to Polaroid Corporation. Belt driven automatic reflex camera. 3,889,280, Cl. 354-86.000.

Bidlack, Harvey D., to Dow Chemical Company, The. Chemical treepruning method. 3,888,656, Cl. 71-94.000.

Biedermann, Kurt: *See*—
Bigalke, Erhard; Radmann, Dietrich; Klein, Erwin; Melichar, Rainer; and Biedermann, Kurt, 3,888,220.

Biensan, Michael; and Potin, Philippe, to Societe Aquitaine-Total Organico. Process for obtaining polyamides. 3,888,832, Cl. 260-78.00L.

Bigalke, Erhard; Radmann, Dietrich; Klein, Erwin; Melichar, Rainer; and Biedermann, Kurt, to Volkswagenwerk Aktiengesellschaft. Internal combustion engine performance control system. 3,888,220, Cl. 123-117.00R.

Bigge, Henry W. Tiedown lug. 3,888,190, Cl. 105-475.000.

Bigorajski, Gunter; and Ellerkamp, Joachim, to Vereinigte Schmirgel- und Maschinenfabriken AG. Coating for flexible abrasive bands. 3,888,640, Cl. 51-298.000.

Billawala, Shahbuddin A., to Burroughs Corporation. Single-turn conductor pattern for microminiature core assemblies in a multitransducer head. 3,889,29[illegible], Cl. 360-123.000.

Bio-Degradable Plastics, Inc.: *See*—
Swanholm, Carl E.; and Caldwell, Robert G., 3,888,804.

Bio-Reagents & Diagnostics, Inc.: *See*—
Whetzel, Lawrence C.; and Townsend, Margaret E., 3,888,739.

Birkin, Michael S., to British Railways Board. Vehicle control systems. 3,888,437, Cl. 246-63.00A.

Bixler, William L., to Gates Rubber Company, The. Belt measuring device. 3,888,014, Cl. 33-174.00R.

Black, Harold D., to United States of America, Navy. Method and apparatus for obtaining the fine scale structure of the earth's gravity field. 3,888,122, Cl. 73-382.000.

Black, Sivalls & Bryson, Inc.: *See*—
Holland, Robert F.; and Peterson, Adrian J., 3,888,644.

Blackwell, John; Gumprecht, William H.; and Starn, Roy Emerson, Jr., to du Pont de Nemours, E. I., and Company. Process for dyeing water swellable cellulosic materials with polypropylene glycols. 3,888,624, Cl. 8-21.00C.

Blair, Penn B.; and Demand, John W., to Brackett Stripping Machine, Inc. Back liner applying apparatus. 3,888,722, Cl. 156-477.00B.

Blanchard, Gordon W., to Blanchard, Gordon W. Moisture free pipe stem mouthpiece. 3,888,263, Cl. 131-201.000.

Blanchette, Leon. Rotation responsive variable diameter pulley. 3,888,130, Cl. 74-230.17E.

Blanco, Milagros V.: *See*—
Boghosian, Malcolm P.; and Blanco, Milagros V., 3,888,782.

Blaszczak, Joseph W. Composition and method for treating virus infections. 3,888,989, Cl. 424-280.000.

Blecherman, Sol S.; Bala, Mitchell J.; Evans, Dennis J.; and Ulion, Nicholas E., to United Aircraft Corporation. Vapor randomization in vacuum deposition of coatings. 3,889,019, Cl. 427-251.000.

Blessin, Ronald W., to Honeywell Information Systems Inc. Data communications subchannel having self-testing apparatus. 3,889,109, Cl. 235-153.0AK.

Blood, Alden E.: *See*—
Snapp, Thomas C., Jr.; and Blood, Alden E., 3,888,880.

Blumhardt, Harold, to Blumhardt Manufacturing, Inc. Filter cap construction. 3,888,382, Cl. 220-202.000.

Blumhardt Manufacturing, Inc.: *See*—
Blumhardt, Harold, 3,888,382.

Boag, Alexander: *See*—
Bader, Henry; and Boag, Alexander, 3,888,876.

Bocek, Robert P., to Xerox Corporation. Apparatus for making multiple alphanumeric copies of a binary coded message. 3,889,292, Cl. 360-15.000.

Bodine Co., Inc.: *See*—
Bodine, Richard Hill, Jr.; and Rosiak, Marion, 3,889,152.

Bodine, Richard Hill, Jr.; and Rosiak, Marion, to Litton Systems, Inc.; and Bodine Co., Inc. Starting and operating ballast for high pressure sodium lamps. 3,889,152, Cl. 315-205.000.

Boeckeler, Benjamin Clark, to Kennametal Inc. Method of centrifugally compacting granular material using a destructible mold. 3,888,662, Cl. 75-203.000.

Boehringer Ingelheim GmbH: *See*—
Koppe, Herbert; Stahle, Helmut; Kummer, Werner; Muacevic, Gojko; and Traunecker, Werner, 3,888,898.
Narr, Berthold; Roch, Josef; Muller, Erich; and Nickl, Josef, 3,888,851.

Boeing Company, The: *See*—
Jones, Everett E., 3,888,618.
Larrimer, Walter H., Jr.; and Duncan, Donald L., 3,888,098.
Sealey, Francis, 3,888,436.

Boelkins, Wallace G., to Uni-Mist, Inc. Positive-displacement mist lubricator. 3,888,420, Cl. 239-412.000.

Boghosian, Maicolm P.; and Blanco, Milagros V., to Allergan Pharmaceuticals. Soft contact lens preserving solution. 3,888,782, Cl. 252-106.000.

Bogue, John C.: *See*—
Sarbacher, Robert I.; and Mauch, Robert E., 3,889,170.

Bogus, Klaus; and Mattes, Siegfried, to Licentia-Patent-Verwaltungs-G.m.b.H. Photocell. 3,888,697, Cl. 136-89.000.

Bohner, Beat: *See*—
Dawes, Dag; Meyer, Willy; and Bohner, Beat, 3,888,874.

Bokserman, July Izrailevich: *See*—
Chersky, Nikolai Vasilievich; Klimenko, Alexandr Petrovich; Bokserman, July Izrailevich; Kalina, Alexandr Isaevich; and Karimov, Farit Abdrakhmanovich, 3,888,434.

Bolduc, Leo J. Automatic signal newspaper receptacle. 3,888,409, Cl. 232-1.00C.

Bolgar, Francis; and Fraser, John James. Film projectors. 3,888,576, Cl. 353-76.000.

Bolk, Fredrik Willem, to Veco Zeefplatenfabriek B.V. Precision or micro sieve structure. 3,888,765, Cl. 209-352.000.

Bolz, Gunner: *See*—
Leute, Richard K.; and Bolz, Gunner, 3,888,866.

Bone, Arnold R., to Dennison Manufacturing Company. Feed mechanism for dispensing apparatus. 3,888,402, Cl. 226-157.000.

Bonewitz, Everett D., to Victor Plastics, Inc. Compression release for motorcycle engines. 3,888,218, Cl. 123-97.00B.

Bonn, Clifford; and Wilson, Kenneth R. A., to Irvin Industries Inc. Vehicle safety device. 3,888,504, Cl. 280-150.0AB.

Boots Co., Ltd., The: *See*—
Lowe, James L., 3,888,871.

Boots, Edmund R. Artificial reef. 3,888,209, Cl. 119-1.000.

Borden, Inc.: *See*—
Erekson, Arthur B., 3,888,363.

Borg-Warner Corporation: *See*—
Hoeg, Donald F., 3,888,630.

Bornand, Robert M., to Valinor Anstalt. Ballistic set including a projectile and its launching device. 3,888,031, Cl. 42-1.00F.

Boschetti, Eugene; Molho, Darius; and Fontaine, Louis, to Lipha, Lyonnaise Industrielle Pharmaceutique. Pharmaceutical composition containing amino alcohols derived from ortho-trans-hydroxycinnamic acids, their esters and their amides. 3,888,993, Cl. 424-309.000.

Bose, Ajit Kumar: *See*—
Saint Eve, Daniel R.; and Bose, Ajit Kumar, 3,888,609.

Bossen, David A., to Measurex Corporation. Apparatus for measuring the weight per unit area of a manufactured sheet product consisting of a reinforcing material surrounded by a bulk material. 3,889,121, Cl. 250-359.000.

Bosshard, Ernst, to Sulzer Brothers Ltd. Irradiation plant for flowable material. 3,889,123, Cl. 250-437.000.

Bourne, Henri Jacques. Root-ball wrappings for the plantation of plants and methods for their manufacture. 3,888,042, Cl. 47-37.000.

Bourne, Henry A., Jr.; and Schroeder, Rondon L., to Continental Oil Company. Control system for a drilling apparatus. 3,888,319, Cl. 175-76.000.

Bowater Packaging Limited: *See*—
Rowlands, Martyn, 3,888,383.

Bowles, John M.: *See*—
Breeden, Donald H.; and Bowles, John M., 3,888,647.

Boyer, James A.; and Dusenberry, Charles L., to General Motors Corporation. Internal combustion engine ignition controller. 3,888,225, Cl. 123-148.00E.

Boyle, Kenneth: *See*—
Strong, Robert Edmund; Boyle, Kenneth; and Grant, John, 3,888,556.

BP Chemicals International Limited: *See*—
Kolombos, Alexander John; McCain, Colin Christopher; and Porter, Eric Andrew, 3,888,889.

Brackett Stripping Machine, Inc.: *See*—
Blair, Penn B.; and Demand, John W., 3,888,722.

Brackmann, Warren A.; and Diianni, Daniel, to Rothmans of Pall Mall Canada Limited. Formation of polymeric fibres. 3,888,610, Cl. 425-72.000.

Bradt, Gordon E. Kinetic sculpture. 3,888,030, Cl. 40-126.00R.
Brady, Stephen F.: *See*—
Veber, Daniel F.; and Brady, Stephen F., 3,888,836.
Brammer, Klaus-Rudiger; and Wieske, Theophil, to Lever Brothers Company. Emulsifier system. 3,889,005, Cl. 426-585.000.
Brands, Frank W. Pavement testing apparatus. 3,888,108, Cl. 73-12.000.
Braun AG: *See*—
Schiebelhuth, Heinz; and Bauer, Herbert, 3,889,192.
Braun Aktiengesellschaft: *See*—
Cobarg, Claus Christian, 3,889,160.
Braun, Arthur R. Integral molded article having the appearance of a tire and an integral wheel-tire. 3,888,545, Cl. 301-63.0PW.
Brecher, Lee E.; and Wu, Christopher K., to Westinghouse Electric Corporation. Electrolytic decomposition of water. 3,888,750, Cl. 204-129.000.
Breckenridge, Roger A.: *See*—
United States of America, National Aeronautics and Space Administration; Tyagi, Ramesh C.; Debnam, William J., Jr.; McNear, Maxwell F.; Crouch, Roger K.; and Breckenridge, Roger A., 3,888,705.
Breckle, Horst Erich: *See*—
Wagenknecht, Benno August; and Breckle, Horst Erich, 3,888,074.
Breed Corporation: *See*—
Breed, David S., 3,888,182.
Breed, David S., 3,889,130.
Breed, David S., to Breed Corporation. Pressure initiating primer system for projectiles. 3,888,182, Cl. 102-73.00R.
Breed, David S., to Breed Corporation. Mass in liquid vehicular crash sensor. 3,889,130, Cl. 307-121.000.
Breeden, Donald H.; and Bowles, John M., to Maul Bros. Inc. Air cooled annular parison blank mold. 3,888,647, Cl. 65-29.000.
Breitner, Wilhelm. Method of applying metal filaments to surfaces. 3,888,711, Cl. 156-93.000.
Brennan, James H., to Pittsburgh Brass Manufacturing Company. Lance supporting coupling. 3,888,520, Cl. 285-310.000.
Brennecke, Henry M., to du Pont de Nemours, E. I., and Company. Recovery of metal values from ore concentrates. 3,888,748, Cl. 204-108.000.
Brennenstuhl, Hugo: *See*—
Stutz, Erwin; and Brennenstuhl, Hugo, 3,888,207.
Bridgestone Tire Company Ltd.: *See*—
Akiyoshi, Katsumi; Terui, Yukimasa; Kirigaya, Hitoshi; and Koyama, Haruo, 3,888,712.
Brieten, Charles Henry. Differential drive mechanism. 3,888,137, Cl. 74-650.000.
Briggs & Stratton Corporation: *See*—
Seilenbinder, Richard W., 3,888,450.
Brinly-Hardy Co., Inc.: *See*—
Doering, Charles W., 3,888,170.
British Nuclear Design of Construction Ltd.: *See*—
Cunningham, Christopher; and Simpkin, Sidney David, 3,888,735.
British Nuclear Fuels Limited: *See*—
Strong, Robert Edmund; Boyle, Kenneth; and Grant, John, 3,888,556.
British Railways Board: *See*—
Birkin, Michael S., 3,888,437.
Broll, Arno; and Mann, Herbert, to Deutsche Gold-und Silber-Scheideanstalt vormals Roessler. Inorganic pigments and process for their production. 3,888,688, Cl. 106-308.00B.
Bron, Dan, to Unitrol Water Saving Products Ltd. Quick-acting water-tap. 3,888,461, Cl. 251-351.000.
Brossi, Arnold; and Pecherer, Benjamin, to Hoffmann-La Roche Inc. Lower alkyl esters of 2-(3,4-dimethoxyphenyl)-4,6-dioxocyclohexane carboxylic acid. 3,888,907, Cl. 260-473.00R.
Brouwer, Anton H. J., to Akzo N.V. Process for the preparation of a protein food product. 3,889,010, Cl. 426-276.000.
Brown, Cicero C. Well drilling apparatus. 3,888,318, Cl. 173-149.000.
Brown, Frank R. Power handle for pivotally interconnected lever tools. 3,888,003, Cl. 30-180.000.
Brown, Hazel E.: *See*—
Winslow, Lester M.; and Brown, Hazel E., 3,889,149.
Brown, Lloyd H.; and Eftax, Daniel S. P., to Quaker Oats Company, The. Process for producing bound aggregate building material. 3,888,816, Cl. 260-39.00R.
Brown, Melancthon S., deceased (Kohn, Gustave, administrator), to Chevron Research Company. Nematocidal n-polyhalovinylthioformamides. 3,888,992, Cl. 424-298.000.
Broxholm, Thomas M.: *See*—
Elmore, Lester C.; and Broxholm, Thomas M., 3,888,159.
Bruck, Rolf: *See*—
Wank, Joachim; Reese, Eckart; Rohrbach, Josef; and Bruck, Rolf, 3,889,040.
Brunk, Klaus: *See*—
Felzer, Bertold; Brunk, Klaus; and Kraemer, Friedhelm, 3,888,502.
Bubniak, William C.; Huellmantel, Louis W.; and Mitchell, Harry R., to General Motors Corporation. Mass flow air meter. 3,888,458, Cl. 251-118.000.
Bubniak, William C., to General Motors Corporation. Flow control valve. 3,888,459, Cl. 251-208.000.
Buchegger, Joachim, to Hauni-Werke Korber & Co. KG. System for programming the starting and stoppage of apparatus for the production and/or processing of cigarettes or the like. 3,889,240, Cl. 340-172.500.
Buide, Norma F.; Lugay, Joaquin C.; and Sims, Rex J., to General Foods Corporation. Hydrolyzed protein in non-dairy whipped topping. 3,889,001, Cl. 426-565.000.
Bulgrin, Wayne E.: *See*—
Davis, John E.; and Bulgrin, Wayne E., 3,889,071.
Bullard Company, The: *See*—
Tomenceak, Arthur A., 3,888,146.
Bundy, Otto M.: *See*—
Seith, Robert T.; and Bundy, Otto M., 3,888,041.
Seith, Robert T.; and Bundy, Otto M., 3,888,197.
Seith, Robert T.; and Bundy, Otto M., 3,888,418.
Bunker Ramo Corporation: *See*—
Wagenknecht, Benno August; and Breckle, Horst Erich, 3,888,074.
Burgess, Thomas H., to Fischer and Porter Co. Vortex type flowmeter with strain gauge sensor. 3,888,120, Cl. 73-194.00B.
Burguette, Mario D., to Minnesota Mining and Manufacturing Company. Process for making beta-acryloyloxypropanoic acid. 3,888,912, Cl. 260-486.00R.
Burgwald, Glenn M.; Kruger, William P.; and Hammond, Donald L., to Hewlett-Packard Company. Frequency stabilized gas laser. 3,889,207, Cl. 331-94.50S.
Burk, George A.: *See*—
Pews, R. Garth; Goralski, Christian T.; and Burk, George A., 3,888,869.
Burk, William R., to Dow Chemical Company, The. Cable filling compounds. 3,888,709, Cl. 156-48.000.
Burk, William R., to Dow Chemical Company, The. Processing cable filling compounds. 3,888,710, Cl. 156-48.000.
Burkhardt, Siegfried: *See*—
Scheibitz, Wolfgang; Staendeke, Horst; and Burkhardt, Siegfried, 3,888,971.
Burnsweig, Joseph; and Arneson, Steven H., to Hughes Aircraft Company. Circulative surface acoustic wave device. 3,889,212, Cl. 333-30.00R.
Burroughs Corporation: *See*—
Billawala, Shahbuddin A., 3,889,295.
Cola, Rudolph A., 3,889,274.
Hoffman, Paul R., 3,888,340.
Malmer, Michael M., Jr., 3,889,242.
Przybylek, George John, 3,889,150.
Burt, George A., Jr.; and Neill, William M., to International Paper Company. Machine for handling sheet material. 3,888,395, Cl. 223-1.000.
Buss, Keen W., to Marine Protein Corporation. Fish husbandry system utilizing at least partial recirculation of water. 3,888,210, Cl. 119-3.000.
Butts, Edward E., to Clark Equipment Company. Air distribution means for a refrigerated meat case. 3,888,091, Cl. 62-256.000.
Cabot, Nat. Golf putter with true stroke checking device. 3,888,492, Cl. 273-186.00A.
Caldwell, John R., to Xerox Corporation. Semi-automatic document handler. 3,888,581, Cl. 355-64.000.
Caldwell, Robert G.: *See*—
Swanholm, Carl E.; and Caldwell, Robert G., 3,888,804.
California R & D Center: *See*—
Sims, Anson, 3,888,488.
Camacho, Vasco G.: *See*—
Anderson, James J.; and Camacho, Vasco G., 3,888,953.
Campbell, Evan E.; Eutsler, Bernard C.; and Trujillo, Patricio E., to United States of America, Energy Research and Development Administration. Atmospheric mercury sampling material and method. 3,888,124, Cl. 73-421.50R.
Campeau Corporation: *See*—
McNaughton, Melville, 3,888,169.
Canadian Industries Limited: *See*—
Kenig, Samuel, 3,888,727.
Canadian Patents and Development Limited: *See*—
Narang, Saran A.; Dheer, Surinder K.; and Wightman, Robert H., 3,888,950.
Canon Kabushiki Kaisha: *See*—
Hashimoto, Shigeru, 3,889,282.
Ichiyanagi, Toshikazu, 3,888,594.
Ogiso, Mitsutoshi; and Taguchi, Tetsuya, 3,889,277.
Taguchi, Tetsuya; Yazaki, Mutsunobu; and Matsuda, Mutsuhide, 3,889,281.
Tanaka, Hiroshi; Soma, Ikuo; Ito, Yoshikazu; and Kamijo, Masayasu, 3,889,033.
Canron Limited: *See*—
Davies, Barry J., 3,888,297.
Cante, Charles J.; and Frost, John R., to General Foods Corporation. Percolator packages and process therefor. 3,889,000, Cl. 426-84.000.
Cantrell, Ben H., to United States of America, Navy. Adaptive low pass filter. 3,889,108, Cl. 235-152.000.
Capitelli, Giacomo: *See*—
Gambini, Arnaldo; and Capitelli, Giacomo, 3,889,116.
Car Tapes Inc.: *See*—
Herst, Richard J., 3,888,494.
Carapus Company, Limited: *See*—
Marumo, Hideo, 3,888,797.
Cardone, Paul A., to Polaroid Corporation. Photographic products and processes with barrier layers for diffusable dyes. 3,888,669, Cl. 96-3.000.
Carl Zeiss Stiftung: *See*—
Rossmann, Dieter, 3,889,283.

Carlson, Lee A.; and Miekka, Richard G., to Dennison Manufacturing Company. Electrophotographic printing. 3,888,664, Cl. 96-1.400.

Carlson, Lowell D.: *See—*
Reese, Gerald D.; Shank, Gerald G.; and Carlson, Lowell D., 3,888,214.

Carlsson, Rolf Gottfrid. Motor-driven washing apparatus. 3,887,954, Cl. 15-50.00C.

Carmien, Joseph Allen; Davis, Elbert; and Cervi, Roger G., to Nupla Corporation. Apparatus for attaching fiberglass handles. 3,888,721, Cl. 156-423.000.

Carr, Albert Anthony, to Richardson-Merrell Inc. 4-[4-(Alpha-hydroxybenzyl)piperidino]4'-fluorobutyrophenone derivatives. 3,888,867, Cl. 260-293.800.

Carroll, Alexander A.: *See—*
Sheilds, J. Rodger; and Carroll, Alexander A., 3,887,976.

Carver, David, to Lockheed Aircraft Corporation. Sealing and moisture-proofing of electrical joints. 3,889,047, Cl. 174-84.00R.

Casio Computer Co., Ltd.: *See—*
Hakata, Masayuki, 3,889,110.

Cassella Farbwerke Mainkur Akt.: *See—*
Greve, Heinz Gunter; and Resag, Klaus, 3,888,899.

Cast Metal Industries, Inc.: *See—*
Jones, Roland P., 3,888,191.

Caster, Richard W.: *See—*
Fraser, Richard S.; Allison, Cecil J., Jr.; Caster, Richard W.; McConnel, Ronald J.; Kribich, Roland E.; and Jone, Paul Y., 3,888,715.

Caterpillar Tractor Co.: *See—*
Bauer, Ralph L.; and Simpson, Fred E., 3,888,357.

Catherino, Henry A., to General Electric Company. Rechargeable cell having improved cadmium negative electrode and method of producing same. 3,888,695, Cl. 136-24.000.

Cauffiel, Ford B. Method and apparatus for removing scale from metal sheets. 3,888,048, Cl. 51-39.000.

Cauffiel, Ford B. Tapered pole made of variable width metal strips. 3,888,283, Cl. 138-150.000.

Cazaux, Michel; and Cros, Jean, to Societe Cortial. Quercetin derivatives. 3,888,842, Cl. 260-210.00F.

Celanese Corporation: *See—*
Levy, Leon B.; and Fisher, Gene J., 3,888,922.
Manning, Andrew J.; and Ram, Michael J., 3,888,895.

Central Soya Company, Inc.: *See—*
Turro, Eugene J.; and Sipos, Endre F., 3,888,996.

Cericola, Robert F., to United States of America, America. Axial component force transmitting arrangement. 3,888,475, Cl. 267-174.000.

Cervi, Roger G.: *See—*
Carmien, Joseph Allen; Davis, Elbert; and Cervi, Roger G., 3,888,721.

Chalex, Paul; and Mather, Selwyn R., to Richardson Company, The. Rubber compositions with improved performance at sub-zero temperatures. 3,888,814, Cl. 260-33.6AQ.

Chao, Tsai Hsiang, to American Cyanamid Company. Flame retardant composition containing tetrakis (hydroxymethyl) phosphonium oxalate. 3,888,779, Cl. 252-8.100.

Chaplin, Arthur H.: *See—*
Hershberg, David E.; Chaplin, Arthur H.; and Dewland, Joseph E., 3,889,191.

Chapman, Arthur John, to Sperry Rand Corporation. Manure spreader. 3,888,424, Cl. 239-657.000.

Chas. Taylor's Sons Co., The: *See—*
Manigault, Edward L., 3,888,687.

Chay, Dong Myung, to du Pont de Nemours, E. I., and Company. Process for preparing a catalytically active ceramic coatings. 3,888,790, Cl. 252-432.000.

Chem Systems Inc.: *See—*
Espino, Ramon L.; and Pletzke, Thomas S., 3,888,896.

Chemisch-Pharmazeutische Fabrik Adolf Klinge & Co.: *See—*
Wagner, Josef; and Grill, Helmut, 3,888,994.

Chemtan Company: *See—*
Dawson, William Orval, 3,888,625.

Cherian, Gabriel B.: *See—*
Alderman, Albert D., Jr.; and Cherian, Gabriel B., 3,888,478.

Chersky, Nikolai Vasilievich; Klimenko, Alexandr Petrovich; Boksерman, July Izrailevich; Kalina, Alexandr Isaevich; and Karimov, Farit Abdrakhmanovich. Method of pipeline transportation of natural gas. 3,888,434, Cl. 243-38.000.

Chevron Research Company: *See—*
Brown, Melancthon S., deceased, 3,888,992.
Ebert, Wayne A., 3,888,760.
Edwards, Laroy H., 3,888,879.
Guenther, Lloyd M., 3,887,971.

Chikaraishi, Takayo, to Nissan Motor Company Limited. Window regulator for motor vehicle. 3,888,047, Cl. 49-351.000.

Child, Edward T.; and Robin, Allen M., to Texaco Inc. Production of methane. 3,888,043, Cl. 48-197.00R.

Chisso Corporation: *See—*
Komatsu, Hajime; and Mukai, Seio, 3,888,679.

Chisum, Finis L. Auto body and frame straightening devices. 3,888,100, Cl. 72-305.000.

Chittenden, Donald F. Orthodontic face bow. 3,888,007, Cl. 32-14.00D.

Chong, Victor M., to Sun Research and Development Co. Electrolytic separation of oxygen from air. 3,888,749, Cl. 204-129.000.

Chow, Ho, to Beatrice Foods Co. Gun type fluid control device. 3,888,421, Cl. 239-456.000.

Christensen, Nils J.; and Symon, Ted, to Universal Oil Products Company. Production of coumarin. 3,888,883, Cl. 260-343.20R.

Christiansen, Wilbert W.: *See—*
Arnaudin, Edwin H., Jr.; Christiansen, Wilbert W.; and Hazelett, Robert L., Jr., 3,888,718.

Chupp, John Paul, to Monsanto Company. Phenyl-N-(1-alkenyl)-N-methylcarbamates. 3,888,903, Cl. 260-468.00E.

Ciba-Geigy Corporation: *See—*
Beriger, Ernst, 3,888,979.
Dawes, Dag; Meyer, Willy; and Bohner, Beat, 3,888,874.
Dexter, Martin, 3,888,824.

Cieslak, Richard F.; and Balding, John V., to Industrial Electronics Service Co. Automatic control for audible electronic warning system. 3,889,256, Cl. 340-384.00E.

Cincinnati Electronics Corporation: *See—*
Shaw, George W., Jr., 3,889,117.

Cincinnati Milacron Inc.: *See—*
Gough, Robert G., 3,888,823.

Cincinnati Mine Machinery Company, The: *See—*
Krekeler, Claude B., 3,888,133.

Cities Service Research & Development Co.: *See—*
Stewart, Norman C., 3,888,761.

Clark, Anthony John. Apparatus for the determination of the thermal conductivity of gases. 3,888,110, Cl. 73-27.000.

Clark Equipment Company: *See—*
Butts, Edward E., 3,888,091.
Patton, Jon Richard; and Sisson, Ronald Loren, 3,888,323.

Clark, Samuel S. Urethrogram device. 3,888,234, Cl. 128-2.00R.

Clarke, Wallace Eugene: *See—*
Thompson, James Lawrence Earl; Clarke, Wallace Eugene; and Gale, James, 3,889,059.

Clarke, William; Dawson, Timothy Leslie; and Nichols, Douglas Alan, to Imperial Chemical Industries Limited. Transfer materials. 3,888,623, Cl. 8-2.500.

Clausi, Adolph Scott; Glicksman, Martin; and Farkas, Elizabeth, to General Foods Corporation. Spoonable frozen gelatin dessert concentrate. 3,889,002, Cl. 426-576.000.

Clauss, Gunter: *See—*
Reimann, Herbertus; and Clauss, Gunter, 3,888,365.

Cleeland, Roy, Jr.; and Hager, Hans Jacob, to Hoffmann-La Roche Inc. Amino lower alkyl ether derivatives of opium alkaloids. 3,888,864, Cl. 260-285.000.

Clements, George W.: *See—*
Last, Bernard; Weinberger, Eugene M.; Gray, James R.; Clements, George W.; and Deffenbaugh, Ralph E., 3,888,106.

Clipner, George R. Easily openable envelope. 3,888,408, Cl. 229-85.000.

Closmann, Philip J., to Shell Oil Company. Heating through fractures to expand a shale oil pyrolyzing cavern. 3,888,307, Cl. 166-272.000.

Cobarg, Claus Christian, to Braun Aktiengesellschaft. Spark-producing arrangement for a lighter with a battery. 3,889,160, Cl. 317-96.000.

Coca-Cola Company, The: *See—*
Sedam, Jason K., 3,888,466.

Coch, Lester, to Waldes Kohinoor, Inc. Apparatus for thermally transforming metal parts. 3,888,471, Cl. 266-4.00A.

Coded Signatures, Inc.: *See—*
Mayer, George L., Jr.; and Dobbins, David L., 3,889,056.

Coghill, William W.; and Rotramel, William J., to Ozark-Mahoning Company. Agglomerating sodium sulfate. 3,888,635, Cl. 23-313.000.

Cogliano, Gregory P.: *See—*
Gribens, Joel A.; and Cogliano, Gregory P., 3,888,380.

Cola, Rudolph A., to Burroughs Corporation. Electrostatic printing apparatus and method employing optical charge deposition. 3,889,274, Cl. 346-74.00J.

Coleman, Donald Jackson. Ultrasonsically vibrated surgical cutting instrument. 3,888,004, Cl. 30-272.00A.

Colgate-Palmolive Company: *See—*
Freedman, Jules, 3,888,873.
Hansen, Kenneth R., 3,888,798.
Schnettler, Richard A.; and Suh, John T., 3,888,860.
Schnettler, Richard A.; and Suh, John T., 3,888,861.

Collins, Daniel E.: *See—*
Jackson, Larry L.; Seifert, Walter F.; and Collins, Daniel E., 3,888,777.

Collins, William O. Method and apparatus for treatment of foliated metallic bearing materials. 3,888,425, Cl. 241-5.000.

Columbia Scientific Industries, Inc.: *See—*
Rhodes, John R., 3,889,113.

Colwell, Robert E.; Liegois, William A.; Wilks, Gerald W.; and Vrcelj, Mihailo J., to Continental Can Company, Inc. Method of increasing the speed of chemical reaction between liquid and solid reactants using centrifugal force. 3,888,973, Cl. 423-493.000.

Combos, E. Russell: *See—*
Reed, Edgar A.; and Combos, E. Russell, 3,889,224.

Comeaux, Harold J. Garbage bag support and storage device. 3,888,442, Cl. 248-98.000.

Commonwealth Scientific and Industrial Research Organization: *See—*
Holmes, Ralph John; Wylie, Alan Wilson; and McCracken, Kenneth Gordon, 3,889,112.
Willis, Donald; Battaerd, Hendrik Adriaan Jacobus; Lang, Gunter Anton; and Weiss, Donald Eric, 3,888,928.

Communications Satellite Corporation: *See—*
Lindmayer, Joseph; Curtin, Denis John; Haynos, Joseph Gabriel; and Meulenberg, Andrew, Jr., 3,888,698.

Compac Corporation: *See—*
French, John B., 3,888,725.
Compagnie Generale d'Electricite: *See—*
Lavarini, Bernard, 3,889,209.
Compagnie Industrielle des Telecommunications Cit-Alcatel: *See—*
Crapet, Jean, 3,888,270.
Sinobad, Dusan, 3,889,244.
Constantin Graf Von Berckheim: *See—*
Eichmeier, Joseph, 3,889,180.
Construction Specialties Inc.: *See—*
Reifsnyder, Howard B., 3,888,599.
Construzioni Meccaniche Lonati di Lonati Francesco & Figli (Ettore, Fausto, Tiberio)S.n.c.: *See—*
Lonati, Francesco, 3,888,094.
Conti, Carl. Field goal game toy. 3,888,485, Cl. 273-94.00R.
Continental Can Company, Inc.: *See—*
Colwell, Robert E.; Liegois, William A.; Wilks, Gerald W.; and Vrcelj, Mihailo J., 3,888,973.
Novak, James B., 3,888,384.
Continental Gummi-Werke Aktiengesellschaft: *See—*
Menell, Hans; and Rach Heinz-Dieter, 3,888,292.
Continental Oil Company: *See—*
Bourne, Henry A., Jr.; and Schroeder, Rondon L., 3,888,319.
Hudson, Joseph A., Jr., 3,888,936.
Starks, Charles M., 3,888,931.
Controls Company of America: *See—*
Zonneveld, Laurens; and Ehs, Eugene, 3,888,277.
Cook, Roy G.; and Jackson, James P., to Parke, Davis & Company. Disposable absorbent articles. 3,888,257, Cl. 128-296.000.
Cooke, Carl W., to CWC Industries. Safety closure cap for containers. 3,888,376, Cl. 215-217.000.
Cooke, Claude E., Jr., to Exxon Production Research Company. Hydraulic fracturing method. 3,888,311, Cl. 166-280.000.
Cooley, Kenton Parkes; and Jago, Edward John, to Foseco International Limited. Production of ingots. 3,888,298, Cl. 164-137.000.
Coon, James A. Disposable combination file and handle. 3,887,973, Cl. 29-78.000.
Cooper, Michael T., to United States of America, Navy. Vapor pressure regulator. 3,888,089, Cl. 62-50.000.
Coors Container Company: *See—*
Herrmann, Thomas R., 3,888,199.
Cordi, Vincent A.; and Gurski, Chester S., to International Business Machines Corporation. Shift register buffer apparatus. 3,889,241, Cl. 340-172.500.
Cornell Research Foundation, Inc.: *See—*
Eastman, Lester F., 3,889,203.
Corning Glass Works: *See—*
Orso, Francis L.; and Piazza, Giacomo J., 3,888,963.
Pettersen, Aage, 3,889,255.
Corrigan, Richard A., to Bell & Howell Co. Single film light-protected photosensitive element. 3,888,675, Cl. 96-67.000.
Corry, Thomas M., to General Motors Corporation. Apparatus for generating three-phase sinusoidal voltages. 3,889,174, Cl. 321-9.00R.
Cosco, Inc.: *See—*
Basey, Otis, 3,888,192.
Cosmo, Nicola: *See—*
Ravera, Giovanni; and Cosmo, Nicola, 3,888,147.
Costello, Anthony C.; and Shaffer, Leon L., to Loopco Industries, Inc. Control system for a strip accumulator. 3,888,430, Cl. 242-55.000.
Courbat, Pierre; and Valenza, Andre, to ZYMA S.A. Medicaments containing epicatechin-2-sulfonic acids and salts thereof. 3,888,990, Cl. 424-283.000.
Cox, Charles H., III; and Aukerlund, Albin M., to Cox, Charles H., III. Method and system for transmitting signals in theatres. 3,889,252, Cl. 340-313.000.
Cox, William F. Boat trailer. 3,888,367, Cl. 214-84.000.
Crafts, Robert L.: *See—*
Anderson, Richard S.; Crafts, Robert L.; Murphy, John A.; Patterson, Irvin L.; and Schultz, Harold P., 3,889,294.
Craig, Gale M., to General Motors Corporation. Sealed beam headlamp unit leak detection system. 3,888,111, Cl. 73-40.700.
Cranleigh Electro-Thermal, Inc.: *See—*
Cutler, Percy H., 3,889,179.
Crapet, Jean, to Compagnie Industrielle des Telecommunications Cit-Alcatel. Automatic device for surface treatment. 3,888,270, Cl. 134-57.00R.
Crawford, Ralph W.: *See—*
Snyder, Paul D.; and Crawford, Ralph W., 3,888,039.
Crawford, Thomas H.: *See—*
Kostelnicek, Richard J.; Herbert, Curtis B.; and Crawford, Thomas H., 3,889,229.
Cree, George B., Jr.: *See—*
Seaton, William J., 3,889,290.
Crees, Silas Ray. Cable bender. 3,888,101, Cl. 72-388.000.
Crescentini, Lamberto; and Wells, Rodney Lee, to Allied Chemical Corporation. Antistatic fiber containing chain-extended tetrols based on diamines. 3,888,944, Cl. 260-857.0PG.
Crompton, Eric John: *See—*
Zimmermann, Detlef; Lougheed, James Hugh; and Crompton, Eric John, 3,889,262.
Cros, Jean: *See—*
Cazaux, Michel; and Cros, Jean, 3,888,842.
Crosby, Robert L.: *See—*
Tilman, Milton M.; Crosby, Robert L.; and Neumeier, Leander A., 3,888,703.
Cross, David Edward, to Smiths Industries Limited. Liquid measuring apparatus. 3,888,126, Cl. 73-426.000.
Cross Europa-Werk GmbH: *See—*
Baudermann, Adolf, 3,888,161.
Cross, James M.; Hudson, George A.; and Hixenbaugh, Joseph C., to Mobay Chemical Corporation. Polyester polyols. 3,888,908, Cl. 260-475.00P.
Cross, Radley; and Laessig, John, to Gilbreth Company. Banding machine. 3,888,067, Cl. 53-292.000.
Cross, Thomas R., to Xerox Corporation. Semi-automatic document handler. 3,888,585, Cl. 355-75.000.
Crouch, Roger K.: *See—*
United States of America, National Aeronautics and Space Administration; Tyagi, Ramesh C.; Debnam, William J., Jr.; McNear, Maxwell F.; Crouch, Roger K.; and Breckenridge, Roger A., 3,888,705.
CTS Corporation: *See—*
Zdanys, John; and Kelver, William L., 3,889,088.
Cummingham, S. J.: *See—*
Yie, Gene G.; Cummingham, S. J.; and Rosenberg, Robert E., 3,888,652.
Cunningham, Christopher; and Simpkin, Sidney David, to British Nuclear Design of Construction Ltd. Integral-fuel blocks. 3,888,735, Cl. 176-84.000.
Cuntze, Ulrich: *See—*
Duwel, Dieter; Diery, Helmut; and Cuntze, Ulrich, 3,888,978.
Curtin, Denis John: *See—*
Lindmayer, Joseph; Curtin, Denis John; Haynos, Joseph Gabriel; and Meulenberg, Andrew, Jr., 3,888,698.
Cutler, Percy H., to Cranleigh Electro-Thermal, Inc. Directional pickup coil and oscillator apparatus for the location of buried electrically conducting elements. 3,889,179, Cl. 324-3.000.
CWC Industries: *See—*
Cooke, Carl W., 3,888,376.
Dahlquist, John C., to Minnesota Mining and Manufacturing Company. Off-axis circular coordinate optical scanning device and code recognition system using same. 3,889,102, Cl. 235-61.70R.
Daimler-Benz Aktiengesellschaft: *See—*
Flaig, Manfred, 3,888,607.
Hanke, Hans, 3,888,335.
D'Alelio, Gaetano F. Halogenated esters of phosphorus-containing acids (II). 3,888,844, Cl. 260-214.000.
Dalmasso, Claudio: *See—*
Sella, Lino; and Dalmasso, Claudio, 3,889,223.
D'Amato, Salvatore F.; and Foote, Chauncey P., Jr., to American Bank Note Company. Intaglio printing press with web wiping apparatus having supply and take-up reels outside frame. 3,888,172, Cl. 101-156.000.
Daniels, Peter J. L.: *See—*
Panitz, Eric; and Daniels, Peter J. L., 3,888,986.
D'Aragon, Paul. Sewage treatment tank. 3,888,767, Cl. 210-151.000.
Dart Industries Inc.: *See—*
Arrandale, Roy S.; Walding, Wayne A.; and Daugherty, Barney R., 3,889,030.
Loughry, Don J., 3,888,385.
Dassler, Adolf. Running sole for sports shoe. 3,888,026, Cl. 36-25.00R.
Datta, Arthur S., to International Harvester Company. Retaining assembly. 3,888,597, Cl. 403-326.000.
Daugherty, Barney R.: *See—*
Arrandale, Roy S.; Walding, Wayne A.; and Daugherty, Barney R., 3,889,030.
Daumas, Jean Claude, to Rhone-Progil. Catalysts for the non-selective oxychlorination of hydrocarbons. 3,888,791, Cl. 252-455.00R.
Davies, Barry J., to Canron Limited. Method of producing ferrous castings with cast-in ferrous inserts. 3,888,297, Cl. 164-100.000.
Davies, Robert William, to Molins Limited. Packets. 3,888,407, Cl. 229-44.0CB.
Davis, Elbert: *See—*
Carmien, Joseph Allen; Davis, Elbert; and Cervi, Roger G., 3,888,721.
Davis, John E.; and Bulgrin, Wayne E., to Lockheed Aircraft Corporation. Handset cradle. 3,889,071, Cl. 179-100.00R.
Dawes, Dag; Meyer, Willy; and Bohner, Beat, to Ciba-Geigy Corporation. Phosphorus esters of 5-amino-1,2,4-triazol-3-ol. 3,888,874, Cl. 260-308.0DR.
Dawson, Timothy Leslie: *See—*
Clarke, William; Dawson, Timothy Leslie; and Nichols, Douglas Alan, 3,888,623.
Dawson, William Orval, to Chemtan Company. Method of chrome-retanning leather. 3,888,625, Cl. 8-94.270.
Dayco Corporation: *See—*
Robinson, Douglas N., 3,888,422.
Dayton Electronic Products Company: *See—*
Kubach, Reinhold W., 3,889,289.
Debesis, John R., to General Electric Company. Transparent multiple contact for semiconductor light conversion elements. 3,889,286, Cl. 357-67.000.
Deblandre, Claude; and Guyaux, Jean, to Solvay & Cie. Thermal stabilization of vinyl resins with derivatives of alpha-phenylindole. 3,888,818, Cl. 260-45.80N.
Debnam, William J., Jr.: *See—*
United States of America, National Aeronautics and Space Administration; Tyagi, Ramesh C.; Debnam, William J., Jr.; McNear, Maxwell F.; Crouch, Roger K.; and Breckenridge, Roger A., 3,888,705.

Decker, Herbert: *See—*
Nowak, Gerald; and Decker, Herbert, 3,888,339.
Deckler, Harry C., to White Farm Equipment Company. Metering apparatus for a seed planter. 3,888,387, Cl. 221-278.000.
Deere & Company: *See—*
Bass, Merlyn Duane; and Gerhardt, Ralph August, 3,888,189.
Johnson, Earl Clinton, 3,888,287.
Deffenbaugh, Ralph E.: *See—*
Last, Bernard; Weinberger, Eugene M.; Gray, James R.; Clements, George W.; and Deffenbaugh, Ralph E., 3,888,106.
DeGraff Products Company: *See—*
Gaski, John Wayne, Jr., 3,888,018.
Deiss, Hans-Dieter; Spengler, Erich; and Georges, Gerard, to Volkswagenwerk Aktiengesellschaft. Apparatus for diagnosing a technical object, especially a motor vehicle. 3,889,273, Cl. 346-33.00R.
De Jong, Maarten Cornelis: *See—*
Hyde, Robert Steven; and De Jong, Maarten Cornelis, 3,888,010.
Dejoux, Jean Veran, to Optical Systems Corporation. Method and apparatus for making animated cartoons. 3,888,572, Cl. 352-87.000.
De Leeuw, Paul; and Kruishoop, Johan Christiaan Willem, to U.S. Philips Corporation. Apparatus for quantitative analysis. 3,888,112, Cl. 73-61.10R.
Delessert, Marcel, to Societe Corobit Anstalt. Fluid conduit connecting device. 3,888,518, Cl. 285-39.000.
Delisle, Robert W., to du Pont de Nemours, E. I., and Company. Substrate loader. 3,887,982, Cl. 29-203.0DS.
Dellecker, Raymond Whyte, to Bell Telephone Laboratories, Incorporated. Camp-on circuitry. 3,889,068, Cl. 179-18.0BG.
Delmar Chemicals, Limited: *See—*
Foldes, Andre; and Delmar, Geza, 3,888,914.
Delmar, Geza: *See—*
Foldes, Andre; and Delmar, Geza, 3,888,914.
De Lorenzo, Joseph D.: *See—*
Bennett, Clarence L., Jr.; De Lorenzo, Joseph D.; and Durling, Hubert P., Jr., 3,889,249.
Delpriore, Paul Joseph: *See—*
White, Joseph Paul; and Delpriore, Paul Joseph, 3,888,053.
Demand, John W.: *See—*
Blair, Penn B.; and Demand, John W., 3,888,722.
Dench, John E.; Knutson, Harry; and Seven, Manfred K., to Allied Chemical Corporation. Process for the preparation of ethylene polymer telomer waxes. 3,888,911, Cl. 260-484.00R.
Denis, Marcel: *See—*
Petitjean, Christian H.; Marchand, Maurice E. L.; and Denis, Marcel, 3,889,214.
Dennis, Richard D., to McDonnell Douglas Corporation. Door holder and release latch. 3,888,526, Cl. 292-97.000.
Dennison Manufacturing Company: *See—*
Bone, Arnold R., 3,888,402.
Carlson, Lee A.; and Miekka, Richard G., 3,888,664.
Derouineau, Rene. Disposal unit. 3,888,427, Cl. 241-46.110.
Deucker, Walter; and Troster, Helmut, to Hoechst Aktiengesellschaft. Process for the preparation of 4-chloro-naphthalic acid anhydride. 3,888,885, Cl. 260-345.200.
Deutsch, Ralph, to Nippon Gakki Seiko Kabushiki Kaisha. Anharmonic overtone generation in a computor organ. 3,888,153, Cl. 84-1.010.
Deutsche Gold-und Silber-Scheideanstalt vormals Roessler: *See—*
Asinger, Friedrich; Gluzek, Karl-Heinz; and Offermanns, Heribert, 3,888,923.
Broll, Arno; and Mann, Herbert, 3,888,688.
Devon, Harry J., to Schuckman, Frederick E., a part interest. Solid fuel emergency burner for light and heat. 3,888,620, Cl. 431-291.000.
Dewey Electronics Corporation, The: *See—*
Bartram, James F., 3,889,266.
Dewland, Joseph E.: *See—*
Hershberg, David E.; Chaplin, Arthur H.; and Dewland, Joseph E., 3,889,191.
Dexter, Martin, to Ciba-Geigy Corporation. N-aroyl-n -(alkylhydroxyphenyl) alkanoylhydrazine stabilizers. 3,888,824, Cl. 260-45.9NC.
De Young, Wayne J., to Uniroyal, Inc. Oil sorption material. 3,888,766, Cl. 210-36.000.
Dheer, Surinder K.: *See—*
Narang, Saran A.; Dheer, Surinder K.; and Wightman, Robert H., 3,888,950.
Diamond, Herrick R.: *See—*
Harmon, James E.; Watrous, Stephen R.; and Diamond, Herrick R., 3,887,963.
Di Cesare, Eugene: *See—*
Levitt, Albert P.; and Di Cesare, Eugene, 3,888,661.
Dierkes, Hermann, to Rheinstahl Henschel Aktiengesellschaft. Observation and measuring stand for optronic devices in a vehicle. 3,888,563, Cl. 350-85.000.
Diery, Helmut: *See—*
Duwel, Dieter; Diery, Helmut; and Cuntze, Ulrich, 3,888,978.
Diesinger, Walter Helmut, to Dynamit Nobel AG. Solid propellant rocket motor. 3,888,079, Cl. 60-245.000.
Dieterman, Alfred Johannes: *See—*
Hendrickriem, Roland; and Dieterman, Alfred Johannes, 3,888,909.
Diianni, Daniel: *See—*
Brackmann, Warren A.; and Diianni, Daniel, 3,888,610.
Dillard, George M., to United States of America, Navy. Broadband radar signal sampler utilizing television scanning. 3,889,257, Cl. 343-6.0TV.
Dills, Raymond L., to General Electric Company. Oven ventilating system. 3,889,100, Cl. 219-393.000.
Dingwall, Andrew Gordon Francis, to RCA Corporation. Method of making a compact guard-banded mos integrated circuit device using framelike diffusion-masking structure. 3,888,706, Cl. 148-187.000.
Dirne, Adrianus Petrus: *See—*
Asselman, George Albert Apolonia; and Dirne, Adrianus Petrus, 3,889,096.
Di Vita, Fosco L.: *See—*
Azzarello, Joseph A.; and Di Vita, Fosco L., 3,888,316.
Dixieco, Inc.: *See—*
Wetzel, Rodney J., 3,888,306.
Dobbins, David L.: *See—*
Mayer, George L., Jr.; and Dobbins, David L., 3,889,056.
Doerge, Herman P.; Slater, Charles G.; and Seiner, Jerome A., to PPG Industries, Inc. High temperature polyurethane foams. 3,888,803, Cl. 260-2.5AQ.
Doering, Charles W., to Brinly-Hardy Co., Inc. Apparatus for collecting debris. 3,888,170, Cl. 100-177.000.
Dohmann, Fritz, to Kabel-und Metallwerke Gutehoffnungshutte AG. Manufacturing of bevel gear by cold forming of blanks in a press die. 3,887,978, Cl. 29-159.200.
Dolle, Karl H.: *See—*
Bernard, Harvey B.; and Dolle, Karl H., 3,888,491.
Dombro, Robert A.; Illingworth, George E.; and Fronczak, Richard A., to Universal Oil Products Company. Preparation of polymerization catalyst systems. 3,888,789, Cl. 252-429.00B.
Douglas, Bobby L., to Dresser Industries, Inc. Variable orifice gas lift valve. 3,888,273, Cl. 137-155.000.
Douglas, Owen: *See—*
Eggington, Wilfred J.; and Douglas, Owen, 3,888,330.
Dow Chemical Company, The: *See—*
Bidlack, Harvey D., 3,888,656.
Burk, William R., 3,888,709.
Burk, William R., 3,888,710.
Jackson, Larry L.; Seifert, Walter F.; and Collins, Daniel E., 3,888,777.
Kenaga, Eugene E., 3,888,982.
Kropscoti, Earle L., 3,888,806.
Kyriacou, Demetrios, 3,888,868.
Langer, Horst G.; and Ayers, Earl D., 3,888,107.
Pews, R. Garth; Goralski, Christian T.; and Burk, George A., 3,888,869.
Tomalia, Donald A.; and Giacobbe, Thomas J., 3,888,847.
Dow Corning Corporation: *See—*
Plueddemann, Edwin P., 3,889,023.
Dowling, Edward H.: *See—*
Ulmschneider, Lawrence A.; and Dowling, Edward H., 3,888,615.
Ulmschneider, Lawrence A.; and Dowling, Edward H., 3,888,616.
Ulmschneider, Lawrence A.; and Dowling, Edward H., 3,888,619.
Downey, Holmes A., to Reliance Electric Company. Flexible shaft coupling. 3,888,093, Cl. 64-13.000.
Downs, John D.; and Massa, Andrew Leo, to Mobil Oil Corporation. Tall oil epoxy ester exterior coating for lap-seam beverage cans. 3,888,808, Cl. 260-18.0EP.
Drelich, Arthur H.; and Lukacs, George J., to Johnson & Johnson. Method of controlling the migration of resin compositions in the manufacture of porous materials. 3,889,024, Cl. 427-243.000.
Dresser Industries, Inc.: *See—*
Douglas, Bobby L., 3,888,273.
Sharki, Martin James; and Miller, Clell D., 3,888,109.
Drimak, Edward G., to International Business Machines Corporation. Stack mechanism for a data processor. 3,889,243, Cl. 340-172.500.
Drori, Mordeki. Injection molder with ram movable indepently of screw feeder. 3,888,393, Cl. 222-229.000.
Droz, Rene, to Les Fabriques d'Assortiments Reunies. Instrument for the simultaneous transmission of the movements of a feeler to at least two reading means. 3,888,012, Cl. 33-174.00L.
Drummond, Warren W., to PPG Industries, Inc. Method of producing crimped fiber glass. 3,887,970, Cl. 28-72.100.
Dryer, Eldon O., to W. S. Shamban & Co. Captive seal with retainers loaded against non-parallel surfaces. 3,888,496, Cl. 277-117.000.
Duchemin, Michel, to Ressorts du Nord S.A. Resiliently yieldable rail fastening. 3,888,414, Cl. 238-349.000.
Duff, Thomas Guy, to Bell Telephone Laboratories, Incorporated. Timer apparatus utilizing operational amplifier integrating means. 3,889,197, Cl. 328-55.000.
Duncan, Donald L.: *See—*
Larrimer, Walter H., Jr.; and Duncan, Donald L., 3,888,098.
Dunkel, Morris: *See—*
Touval, Irving; and Dunkel, Morris, 3,888,820.
Dunlop Limited: *See—*
Whittaker, Kenneth; and Morgan, David Ronald, 3,889,022.
Dunne, Maurice J.: *See—*
Becker, John L.; Hohnecker, Otto; and Dunne, Maurice J., 3,888,361.
Duo-Fast Corporation: *See—*
Ramspeck, Howard B.; and Novak, Raymond F., 3,888,404.
du Pont de Nemours, E. I., and Company: *See—*
Abele, Werner; and Schneider, Rudolf, 3,888,677.
Bellina, Russell Frank, 3,888,872.
Bert, Silas E., 3,888,105.
Blackwell, John; Gumprecht, William H.; and Starn, Roy Emerson, Jr., 3,888,624.
Brennecke, Henry M., 3,888,748.
Chay, Dong Myung, 3,888,790.

Delisle, Robert W., 3,887,982.
Evans, Warren William, 3,888,676.
Kirchner, Jack R.; and Vaughn, Lawrence G., 3,888,890.
Kogon, Irving Charles, 3,888,831.
Kwolek, Stephanie Louise, 3,888,965.
Lee, Shung-Yan Luke, 3,888,672.
Martin, Elmore Louis, 3,888,897.
Middleton, William Joseph, 3,888,924.
Milford, George Noel, Jr., 3,888,821.
Shih, Chi-kai, 3,888,949.
Yates, Paul Clifford, 3,888,788.

Durenec, Peter, to United States of America, Army. Automatic — self contained — light weight spreader bar. 3,888,536, Cl. 294-82.0SF.

Durling, Hubert P., Jr.: *See—*
Bennett, Clarence L., Jr.; De Lorenzo, Joseph D.; and Durling, Hubert P., Jr., 3,889,249.

Duro-Test Corporation: *See—*
Thouret, Wolfgang E.; and Kaufman, Rudolph, 3,889,154.

Dursch, Walter: *See—*
Kleiner, Hans-Jerg; Dursch, Walter; Stahler, Gerhard; and Racky, Werner, 3,888,930.

Dusenberry, Charles L.: *See—*
Boyer, James A.; and Dusenberry, Charles L., 3,888,225.

Dusoe, George D.; and Messineo, Joseph R., to United States of America, Army. Mechanical stabilizer. 3,888,175, Cl. 102-4.000.

Duwel, Dieter; Diery, Helmut; and Cuntze, Ulrich, to Hoechst Aktiengesellschaft. Certain phosphorus acid esters as disinfectants. 3,888,978, Cl. 424-199.000.

Dynamic Industries, Inc.: *See—*
Gorby, Oliver L.; and Rice, Dennis A., 3,888,372.

Dynamit Nobel AG: *See—*
Diesinger, Walter Helmut, 3,888,079.
Pinten, Peter; Naubereit, Hans; and Trautvetter, Werner, 3,888,948.

Dynamit Nobel Aktiengesellschaft: *See—*
van den Berg, Heinz, 3,889,037.

Easley, Wesley C.; White, William F.; and Wingfield, George A., to United States of America, General Counsel-Code GP. Resonant waveguide stark cell. 3,889,182, Cl. 324-58.50A.

Easterly, Donald O., to Eastman Kodak Company. Control mechanism for a web transporting device. 3,888,573, Cl. 352-166.000.

Eastman Kodak Company: *See—*
Bailey, William J., Jr.; Houle, James F.; and Van Norman, Gilden R., 3,888,678.
Easterly, Donald O., 3,888,573.
Kiikka, Lauri W.; and Hartman, Ronald L., 3,888,753.
Reardon, Daniel Francis, 3,888,926.
Snapp, Thomas C., Jr.; and Blood, Alden E., 3,888,880.
Terwilliger, James P.; Gingello, Anthony D.; and Tinney, John R., 3,888,465.
Ulmschneider, Lawrence A.; and Dowling, Edward H., 3,888,615.
Ulmschneider, Lawrence A.; and Dowling, Edward H., 3,888,616.
Ulmschneider, Lawrence A.; and Dowling, Edward H., 3,888,619.

Eastman, Lester F., to Cornell Research Foundation, Inc. Multi-axis cavities for gunn effect amplifiers. 3,889,203, Cl. 330-56.000.

Ebata, Akira; and Kodate, Teiji, to Oiles Kogyo Kabushiki Kaisha. Zinc alloy for bearing. 3,888,660, Cl. 75-178.00A.

Ebauches Bettlach S.A.: *See—*
Bachmann, Peter, 3,888,077.

Eberhard Hoesch & Sohne: *See—*
Schotten, Alfons; and Heimbach, Franz, 3,888,769.

Eberle, John. Liquid vaporising unit. 3,888,954, Cl. 261-18.00A.

Eberle, Marcel K., to Sandoz, Inc. Aryl substituted-4-alkenoic acids. 3,888,920, Cl. 260-515.00R.

Ebert, Wayne A., to Chevron Research Company. Avoiding heat exchanger fouling after crude oil desalting. 3,888,760, Cl. 208-48.000.

Eckerle, William A., to General Electric Company. Refuse compactor. 3,888,171, Cl. 100-229.00A.

Eder, Hans; Meier, Heinz; and Richter, Arend, to Triumph Werke Nuernberg A.G. Sheet feeding mechanism. 3,888,479, Cl. 271-22.000.

Edison, Robert R.: *See—*
Grosboll, Martin P.; and Edison, Robert R., 3,888,633.

Edwards, Laroy H., to Chevron Research Company. Fungicidal n-polyhaloalkylthiosulfonamidothiophenes. 3,888,879, Cl. 260-329.00S.

Eftax, Daniel S. P.: *See—*
Brown, Lloyd H.; and Eftax, Daniel S. P., 3,888,816.

Egan, Georgette S., to Hughes Aircraft Company. Working surface for radiant energy beam cutter. 3,889,095, Cl. 219-121.00L.

Egbert, James: *See—*
Konkal, John; and Egbert, James, 3,888,341.

Eggington, Wilfred J.; and Douglas, Owen, to Aerjet-General Corporation. Means and method of controlling fluid cushion vehicles. 3,888,330, Cl. 180-121.000.

Ehs, Eugene: *See—*
Zonneveld, Laurens; and Ehs, Eugene, 3,888,277.

Eichmeier, Joseph, to Constantin Graf Von Berckheim. Air pollution measuring equipment. 3,889,180, Cl. 324-33.000.

Eiga, Shokichi: *See—*
Isuge, Masami; Uematsu, Shinichi; Ono, Yotsuo; Eiga, Shokichi; and Makita, Minoru, 3,888,771.

Eisenberg, Morris, to Electrochimica Corporation. Electrochemical systems employing organic electrolytic solvents. 3,888,696, Cl. 136-83.00R.

Eisenhauer, Leigh E. Raft adapted for use as a water rescue or recovery litter. 3,887,953, Cl. 9-11.00R.

Elast-O-Cor Products & Engineering Limited: *See—*
Reid, Charles M., 3,888,131.

Eldred, Roger J., to General Motors Corporation. Phosphite ester antioxidants in radiation cured styrene butadiene elastomers. 3,888,752, Cl. 204-159.180.

Electrochimica Corporation: *See—*
Eisenberg, Morris, 3,888,696.

Electron Physics Limited: *See—*
McGee, James Dwyer, 3,889,144.

Electrostatic Equipment Corporation: *See—*
English, William P., 3,889,015.

Elemelt Limited: *See—*
Gell, Philip Anthony Maunsell; and Hann, Douglas Graeme, 3,888,650.

Elfes, Lee E.; and Mueller, Otto, Jr., to Massey-Ferguson Inc. Draft sensing apparatus for tractor. 3,888,315, Cl. 172-7.000.

Ellerkamp, Joachim: *See—*
Bigorajski, Gunter; and Ellerkamp, Joachim, 3,888,640.

Elliot Brothers (London) Limited: *See—*
Jablonski, Jan; and Stone, Colwyn Francis, 3,888,449.

Elliott, John Kenneth. Audio-visual teaching apparatus. 3,888,024, Cl. 35-35.00R.

Ellis, James L., to Owens-Illinois, Inc. Sealing glass compositions containing calcined zirconia vanadia silica stain. 3,888,686, Cl. 106-53.000.

Elm, Donald C., to Timesavers, Inc. Method of and apparatus for rapidly and simultaneously abrading metal workpieces in preselected plural numbers. 3,888,050, Cl. 51-135.00R.

Elmore, Lester C.; and Broxholm, Thomas M., to Pulsepower Systems, Inc. Liquid propellant weapon. 3,888,159, Cl. 89-7.000.

Elshuber, Karl, to Texas Instruments Incorporated. Interlocked plural channel switches and controllable switch devices for use therein. 3,889,195, Cl. 325-464.000.

Elson, David; and Avital, Shlomo, to Yeda Research & Development Co., Ltd. Flat plate electrophoresis. 3,888,759, Cl. 204-299.000.

Elson, David: *See—*
Avital, Shlomo; Silbermann, Menahem; and Elson, David, 3,888,770.

Emery Industries, Inc.: *See—*
Hendrickriem, Roland; and Dieterman, Alfred Johannes, 3,888,909.

Emmerich, Werner S.; Kimblin, Clive W.; and Hundstad, Richard L., to Westinghouse Electric Corporation. Vacuum-type circuit interrupters having an axial magnetic field produced by condensing shield coils. 3,889,079, Cl. 200-144.00B.

Emmerich, Werner S.; and Holmes, Francis Alan, to Westinghouse Electric Corporation. Vacuum interrupter shield protector. 3,889,080, Cl. 200-144.00B.

English, William P., to Electrostatic Equipment Corporation. Coating method with cleaning. 3,889,015, Cl. 427-21.000.

Enoguchi, Yuji: *See—*
Tanaka, Susumu; Enoguchi, Yuji; and Kawabata, Hidetoshi, 3,888,394.

Enokido, Nobuo: *See—*
Yamaguchi, Kazuo; Kanoh, Natsuki; Ito, Isao; and Enokido, Nobuo, 3,888,834.

Entschel, Roland; and Kaeppeli, Viktor, to Sandoz, Inc. Substituted p-aminostyryl 5-chloroindolinium dyes. 3,888,850, Cl. 260-240.900.

Epstein, Barry M., to Action Communication Systems, Inc. System and method for coupling remote data terminals via telephone lines. 3,889,062, Cl. 179-2.0DP.

Erekson, Arthur B., to Borden, Inc. Indexing stacker. 3,888,363, Cl. 214-6.00D.

Erickson, Wayne K.; and Stegelman, Albert F., to Phillips Petroleum Company. Apparatus and method for cooling a crimped tow. 3,887,969, Cl. 28-1.600.

Erico Products, Inc.: *See—*
Groth, John Elmer, 3,889,048.

Erlichman, Irving, to Polaroid Corporation. Riveting apparatus and method. 3,887,984, Cl. 29-243.530.

Ernst Leitz GmbH: *See—*
Kæs, Hans-Herbert, 3,888,685.
Klemann, Heinrich; and Leiter, Herbert, 3,889,279.

ESB Incorporated: *See—*
Larsen, Duane M., 3,888,700.

Espino, Ramon L.; and Pletzke, Thomas S., to Chem Systems Inc. Methanol production. 3,888,896, Cl. 260-449.500.

Essex International Inc.: *See—*
Preston, Jerome A., 3,889,036.

Ethyl Corporation: *See—*
Kuehnhanss, Gerhard O., 3,888,918.
Quint, Richard J., 3,889,018.

Eto, Yoshio, to Rank Xerox, Limited. Development apparatus for electrophotographic printing machine. 3,888,578, Cl. 355-3.0DD.

Eutsler, Bernard C.: *See—*
Campbell, Evan E.; Eutsler, Bernard C.; and Trujillo, Patricio E., 3,888,124.

Evans, Dennis J.: *See—*
Blecherman, Sol S.; Bala, Mitchell J.; Evans, Dennis J.; and Ulion, Nicholas E., 3,889,019.

Evans, Francis E.; and Gilleo, Kenneth B., to Allied Chemical Corporation. Compositions comprising sulfamide for increasing flame resistance of polymers. 3,888,819, Cl. 260-45.80N.

Evans, Francis E.: *See—*
Gilleo, Kenneth B.; Evans, Francis E.; and Sogn, Allen W., 3,888,822.
Evans Products Company: *See—*
Fuller, Oliver C., 3,888,188.
Evans & Sutherland Computer Corporation: *See—*
Sutherland, Ivan E., 3,889,107.
Evans, Warren William, to du Pont de Nemours, E. I., and Company. Silver halide films with wide exposure latitude and low gradient. 3,888,676, Cl. 96-68.000.
Exxon Nuclear Company, Inc.: *See—*
Yates, Jack; and Long, John W., 3,887,980.
Exxon Production Research Company: *See—*
Cooke, Claude E., Jr., 3,888,311.
Gale, Walter W.; Ashcraft, Thomas L., Jr.; and Saunders, Rhoderick K., 3,888,308.
Kostelnicek, Richard J.; Herbert, Curtis B.; and Crawford, Thomas H., 3,889,229.
Exxon Research and Engineering Company: *See—*
Arey, William F., Jr.; and Sawyer, Willard H., 3,888,793.
Siskin, Michael; and Wristers, Jos P., 3,888,937.
F. J. Littell Machine Company: *See—*
Wiig, Chester M., 3,888,400.
Faber, Ruth: *See—*
Grossmann, Max; Faber, Ruth; and Uhrig, Heinz, 3,888,828.
Fabrici, Edward. Bolt guards for door. 3,888,530, Cl. 292-340.000.
Factory Mutual Research Corporation: *See—*
Freeman, Carvie Thomas, 3,888,313.
Fafco Incorporated: *See—*
Vandenbossche, Benjamin Edward, 3,887,967.
Fail Safe Brake Corporation: *See—*
Fontaine, John G., 3,888,552.
Failli, Amedeo; Nelson, Verner R.; Immer, Hans U.; and Gotz, Manfred K., to American Home Products Corporation. Novel hydrazinocarboxamide derivatives and preparation thereof. 3,888,840, Cl. 260-112.500.
Fancher, Llewellyn W., to Stauffer Chemical Company. Ortho-carbamyloxy-benzamide bactericides. 3,888,906, Cl. 260-472.000.
Farallon Industries, Inc.: *See—*
Shamlian, Ralph B.; and Hollingsworth, Ashley J., 3,888,127.
Farkas, Elizabeth: *See—*
Clausi, Adolph Scott; Glicksman, Martin; and Farkas, Elizabeth, 3,889,002.
Farkas nee Kirjak, Maria: *See—*
Szantay, Csaba; Szabo, Lajos; Kreidl, Janos; Kalaus, Gyorgy; Keve, Tibor; Turczanyi, Peter; Polgar, Istvan; Farkas nee Kirjak, Maria; and Lakszner, Katalin, 3,888,865.
Farris, Richard C., to Halliburton Company. Coupling assembly. 3,888,358, Cl. 213-69.000.
Fastner, Thorwald; Niedermayr, Alois; and Bachner, Ernst, to Vereinigte Osterreichische Eisen- und Stahlwerke - Alpine Montan Aktiengesellschaft. Method of continuously casting steel. 3,888,294, Cl. 164-66.000.
Fastway Fasteners, Inc.: *See—*
Schuplin, Jerome T., 3,887,965.
Faulkner, Albert A., to Geometric Data Corporation. Automatic blood smear device with vibration damping means. 3,888,206, Cl. 118-100.000.
Favill, John Edward: *See—*
Roe, Geoffrey Ernest; and Favill, John Edward, 3,888,332.
Fawcett, William E.; and Armbrust, William D., to Kennametal Inc. Hardfaced member and method of attaching hardfacing element thereto. 3,889,093, Cl. 219-77.000.
Fawcett, William E.: *See—*
Heaton, James W.; and Fawcett, William E., 3,888,145.
Federal-Mogul Corporation: *See—*
Reichman, Steven H., 3,888,663.
Felsen, Karl H. Independent jacking system for vehicles and the like. 3,888,464, Cl. 254-86.00R.
Felzer, Bertold; Brunk, Klaus; and Kraemer, Friedhelm, to General Motors Corporation. Energy absorber components for use in vehicles particularly motor vehicles. 3,888,502, Cl. 280-106.00R.
Fendrich, Charles Nelson, Jr., to AMP Incorporated. Power supply having substantially constant output during load switching. 3,889,177, Cl. 323-17.000.
Fentress, Denton C.; and Robinson, Kent W., to Marathon Oil Company. Organic sulfonate extraction process. 3,888,917, Cl. 260-504.00R.
Fergesen, David: *See—*
Sirota, Jilius; Forsyth, Robert S.; and Fergesen, David, 3,888,811.
Ferree, Joseph A., Jr., to Allegheny Ludlum Industries, Inc. Free machining austenitic stainless steel. 3,888,659, Cl. 75-125.000.
Ferro Corporation: *See—*
Meek, William H., 3,888,980.
Fickel, R. Gene, to Universal Oil Products Company. Distillation column reboiler section with internal flow sensing means. 3,888,743, Cl. 202-158.000.
Filipich, Bernard: *See—*
Gregord, Thomas; Filipich, Bernard; and Jancosko, William, 3,888,062.
Fima, Raoul. Underwater weapon. 3,888,033, Cl. 43-6.000.
Fima, Raoul. Anchor bolt construction. 3,888,156, Cl. 85-71.000.
Finch, Lester M.; and Anthony, Andy J., to United States of America, Energy Research and Development Administration. Modular core component support for nuclear reactor. 3,888,731, Cl. 176-50.000.
Finnegan, William G.: *See—*
Koff, Irwin; and Finnegan, William G., 3,888,415.
Firestone Tire & Rubber Company, The: *See—*
Allcock, Harry Rex, 3,888,800.
Willey, Ronald Albert, 3,888,509.
Fischell, Robert E., to John Hopkins University, The. Rechargeable demand inhibited cardiac pacer and tissue stimulator. 3,888,260, Cl. 128-419.0PG.
Fischer, Adolf, to Badische Anilin- Soda-Fabrik Aktiengesellschaft. Synergistic herbicidal mixture. 3,888,655, Cl. 71-91.000.
Fischer, Earl L., to Victor Comptometer Corporation. Air gun with rotatable ammunition loading door. 3,888,229, Cl. 124-49.000.
Fischer, Peter Augustus, to Martin Engineering Co. Method of settling fluent and like material in a form. 3,888,060, Cl. 264-71.000.
Fischer and Porter Co.: *See—*
Burgess, Thomas H., 3,888,120.
Fischer, William L. Massage device. 3,888,241, Cl. 128-24.300.
Fiser, James T.; Jackman, Robert M.; and James, Ray R., to A. O. Smith-Inland, Inc. Fiber reinforced tubular article having abrasion resistant liner. 3,888,714, Cl. 156-171.000.
Fish, Leonard A., to Bank Computer Network Corporation. Disposable carriers for pneumatic conveyors. 3,888,433, Cl. 243-1.000.
Fisher, Gene J.: *See—*
Levy, Leon B.; and Fisher, Gene J., 3,888,922.
Fisher, James I. Device for changing the temperature of containers and their contents. 3,888,092, Cl. 62-376.000.
Fitts, Robert A., to Hekma Advanced Machine Company. Exhaust manifold assembly. 3,888,081, Cl. 60-321.000.
Fitzgerald, Paul F.: *See—*
Herzlich, Harold J.; and Fitzgerald, Paul F., 3,888,291.
Flachbarth, Charles T.; and Myers, John L., to Textron Inc. Service poles. 3,889,044, Cl. 174-48.000.
Flaig, Manfred, to Daimler-Benz Aktiengesellschaft. Gear oil pump, especially for motor vehicle internal combustion engines. 3,888,607, Cl. 418-206.000.
Flanigen, Cameron D. Support stand for puzzle blocks or other items. 3,888,443, Cl. 248-152.000.
Florine, Robert T., to General Motors Corporation. Engine induction air flow control. 3,888,411, Cl. 236-13.000.
Fluck, Josef: *See—*
Zaugg, Roland; and Fluck, Josef, 3,888,076.
Fluid Devices Limited: *See—*
Larner, Donald Alexander, 3,889,219.
FMC Corporation: *See—*
Berkowitz, Sidney, 3,888,855.
Folberth, Fred G., to Banner Metals Division Intercole Automation, Inc. Pallet distribution cage. 3,888,379, Cl. 220-4.00F.
Foldes, Andre; and Delmar, Geza, to Delmar Chemicals, Limited. Novel chemical compounds, processes for making them and pharmaceutical compositions containing them. 3,888,914, Cl. 260-501.160.
Folk, Kenneth Foster: *See—*
Ross, Milton Dean; Folk, Kenneth Foster; and Shatto, Walter Clifton, Jr., 3,887,999.
Fontaine, John G., to Fail Safe Brake Corporation. Auxiliary operating apparatus for vehicle service brake. 3,888,552, Cl. 303-84.00R.
Fontaine, Louis: *See—*
Boschetti, Eugene; Molho, Darius; and Fontaine, Louis, 3,888,993.
Foote, Chauncey P., Jr.: *See—*
D'Amato, Salvatore F.; and Foote, Chauncey P., Jr., 3,888,172.
Foote, Kenneth R. Helicopter with auxiliary load-supporting and lifting capacity. 3,888,435, Cl. 244-58.000.
Ford Motor Company: *See—*
Kolehmainen, Jack A.; and Lemieux, George E., 3,888,143.
Labana, Santokh S.; and Theodore, Ares N., 3,888,943.
Merriam, Frank R., 3,889,141.
Milewski, Marcel F.; and Weiser, Curtis E., 3,889,285.
Rogerson, Jerry B., 3,888,219.
Uy, James C., 3,888,606.
Uy, James C.; and Telang, Yeshwant P., 3,888,746.
Formax, Inc.: *See—*
Richards, Louis R., 3,887,964.
Forsberg, John R., to Helene Curtis Industries, Inc. Permanent waving machine. 3,889,097, Cl. 219-242.000.
Forsbergs, Inc.: *See—*
Kulseth, Leslie G., 3,888,352.
Forsyth, Robert S.: *See—*
Sirota, Jilius; Forsyth, Robert S.; and Fergesen, David, 3,888,811.
Fortman, Ronald F.; and Voorhees, John E., to Minster Machine Company, The. Machine having a drive shaft and a method of operation. 3,888,097, Cl. 72-26.000.
Fortuna Werke Maschinenfabrik AG: *See—*
Belthle, Heinz, 3,888,051.
Foseco International Limited: *See—*
Cooley, Kenton Parkes; and Jago, Edward John, 3,888,298.
Foshee, Wayne O.; and Zapart, Bruno J. Grinding wheel angle dresser. 3,888,230, Cl. 125-11.0AT.
Foster Wheeler Corporation: *See—*
Akturk, Nuri Uygun; and Ashdown, Ronald Arthur, 3,888,213.
Wolowodiuk, Walter, 3,888,212.
Foster, William R.; Sen, Durgacharan; and Skinner, Stanley J., to Monsanto Chemicals Limited. Apparatus for producing a foamed resin sheet in a curved diverging expansion zone. 3,888,614, Cl. 425-224.000.
Fowler, John T., to Arthur D. Little, Inc. Digital compass. 3,888,016, Cl. 33-346.000.

Frank Speno Railroad Ballast Cleaning Co., Inc.: *See—*
Panetti, Romolo, 3,888,052.

Frantz, Robert Houston, to AMP Incorporated. Fastenings and corner joints. 3,888,063, Cl. 52-753.00D.

Franz, Helmut; and Lecoco, David E., to PPG Industries, Inc. Chemical filming solution and process for plating therewith. 3,889,017, Cl. 427-160.000.

Fraser, John James: *See—*
Bolgar, Francis; and Fraser, John James, 3,888,576.

Fraser, Richard S.; Allison, Cecil J., Jr.; Caster, Richard W.; McConnel, Ronald J.; Kribich, Roland E.; and Jone, Paul Y., to Weyerhaeuser Company. Method of inducing high frequency electric current into a thermosetting adhesive joint. 3,888,715, Cl. 156-273.000.

Freake, Ronald; Kuo, Mau H.; and Mehta, Devendra Vaikunthlal, to Miles Laboratories, Inc. Culturing means and test kit. 3,888,741, Cl. 195-139.000.

Freedman, Jules, to Colgate-Palmolive Company. 4H(1)benzothiopyrano(3,4-d)-isoxazoles. 3,888,873, Cl. 260-307.00H.

Freeman, Carvie Thomas, to Factory Mutual Research Corporation. Discharge head and fire protection system utilizing said head. 3,888,313, Cl. 169-16.000.

Freeport Brick Company: *See—*
Keller, Leroy A., 3,889,029.

Freeport Minerals Company: *See—*
Miller, David James, 3,888,966.

French, John B., to Compac Corporation. Air manifold with mask and label applicator utilizing the same. 3,888,725, Cl. 156-556.000.

Frey, Raymond C., to Anchor Hocking Corporation. Package for tumblers and the like. 3,888,348, Cl. 206-427.000.

Freytag, Karl-Heinz; Meyer, Rudolf; and Hoffman, Klaus, to Agfa-Gevaert Aktiengesellschaft. Ink jet process utilizing novel dyes. 3,889,271, Cl. 346-1.000.

Freytag, Karl-Heinz: *See—*
Meyer, Rudolf; Hoffmann, Klaus; Freytag, Karl-Heinz; and Vetter, Hans, 3,889,269.

Fried, John H., to Syntex Corporation. Phosphonates. 3,888,952, Cl. 260-951.000.

Fried. Krupp Gesellschaft mit beschrankter Haftung: *See—*
Redelfs, Hans, 3,888,356.

Friedline, Ernest J.: *See—*
Sorice, Edward L.; and Friedline, Ernest J., 3,887,975.

Fries, Bernard J.; and McLander, Lance E., to Steelcase Inc. Apparatus for post forming laminates. 3,888,613, Cl. 425-160.000.

Fritz, Jack J.; and Lucas, Theodore W., Jr., to Andco Incorporated. Combustion chamber. 3,888,632, Cl. 23-277.00C.

Fronczak, Richard A.: *See—*
Dombro, Robert A.; Illingworth, George E.; and Fronczak, Richard A., 3,888,789.

Frost, John R.: *See—*
Cante, Charles J.; and Frost, John R., 3,889,000.

Fuji Photo Film Co., Ltd.: *See—*
Horie, Ikutaro; and Nagao, Kameji, 3,888,681.
Kuriyama, Takayuki; and Yagi, Motohiko, 3,888,646.
Kuwayama, Shigeo, 3,888,692.
Kuwayama, Shigeo; and Yagi, Motohiko, 3,889,021.
Maekawa, Yukio; Miyano, Shizuo; Yazawa, Kenichiro; and Kondo, Asaji, 3,888,689.

Fujii, Masao; Shimatani, Shiro; Orita, Ryoji; and Takemoto, Isao, to Mitsui Shipbuilding and Engineering Co., Ltd. Prefabrication primer for high tensile steel. 3,888,575, Cl. 252-513.000.

Fujimoto, Kentaro: *See—*
Hamakawa, Hiroshi; Kobari, Sadami; Shimizu, Takeshi; Fujimoto, Kentaro; Hayano, Kazuo; and Matsuda, Tetsuo, 3,888,927.

Fujimoto, Yoshiji: *See—*
Makihara, Hiroshi; Hananoi, Toshihiro; and Fujimoto, Yoshiji, 3,889,234.

Fujita, Fumio: *See—*
Nakashio, Seizo; Sekine, Noriyuki; Toyota, Nobuhiro; and Fujita, Fumio, 3,888,809.

Fujita, Yutaka; Naruchi, Tatsuyuki; and Yoshisato, Eishin, to Teijin Limited. Process for producing epsilon-caprolactam. 3,888,845, Cl. 260-239.30A.

Fujiwhara, Mitsuto; Kasai, Keiji; Satoh, Ryosuke; Nakagawa, Yoshinobu; and Tanigawa, Tuneo, to Konishiroku Photo Industry Co., Ltd. Light-sensitive silver halide color photographic material containing bis-pyrazolone couplers. 3,888,680, Cl. 96-100.000.

Fukasawa, Noburu; Kitagawa, Takanori; and Inoue, Naohiko, to Nissan Motor Company Limited. Headlight wiper mechanism for a motor vehicle. 3,887,958, Cl. 15-250.170.

Fukumori, Yukitsugu, to Nissan Motor Company Limited. Vehicle speed sensor for skid control system. 3,889,259, Cl. 343-7.0ED.

Fukushi, Keiji: *See—*
Isogai, Tokio; Isikawa, Eiichi; Fukushi, Keiji; Amano, Hisao; Ogata, Fumio; and Ikemoto, Norio, 3,889,175.

Fuller, Oliver C., to Evans Products Company. Combined pneumatic and gravity hopper gate controlled outlet. 3,888,188, Cl. 105-282.00R.

Furuno Electric Company, Limited: *See—*
Tanaka, Hideki; Ishida, Kazutaka; Watanabe, Mikio; Inouchi, Mitsuhiro; Yoshioka, Shigeru; Handa, Minoru; and Kitabatake, Asao, 3,889,265.

Furusawa, Tomotaka: *See—*
Yamana, Hirosuke; Kunii, Tadashi; Furusawa, Tomotaka; Sugimura, Yoshihiro; Nakai, Hiroshi; and Hiro, Yasuo, 3,888,826.

G. D. Searle & Co.: *See—*
Miyano, Masateru, 3,888,905.

G.M.T. S.A.: *See—*
Tabur, Marcel, 3,888,066.

Gabr, Saad Zaghoul Mohamed, to A.R.D. Anstalt. Telephone systems with reduced acoustic feedback. 3,889,058, Cl. 179-1.0FS.

Gach, Peter P.; and Montgomery, Gary V., to Sunbeam Plastics Corporation. Child-resistant closure. 3,888,373, Cl. 215-214.000.

GAF Corporation: *See—*
Horai, John C., Jr.; and Little, David C., 3,888,176.
Horai, John C., Jr.; and Little, David C., 3,888,683.
Little, David C., 3,888,684.
Nelson, Arnold S., 3,888,682.

Gagnon, Kenneth M. Waterfowl decoy. 3,888,032, Cl. 43-3.000.

Gale, James: *See—*
Thompson, James Lawrence Earl; Clarke, Wallace Eugene; and Gale, James, 3,889,059.

Gale, Walter W.; Ashcraft, Thomas L., Jr.; and Saunders, Rhoderick K., to Exxon Production Research Company. Use of materials as waterflood additives. 3,888,308, Cl. 166-273.000.

Gallo, Roberto A. Crypt wall construction having removable fronts secured by concealed fasteners and method of construction. 3,888,055, Cl. 52-98.000.

Galluzzo, Christopher G.: *See—*
Galluzzo, Daniel T.; Galluzzo, Christopher G.; and Galluzzo, Vincent, 3,888,231.

Galluzzo, Daniel T.; Galluzzo, Christopher G.; and Galluzzo, Vincent. Fireplace for heat conservation and distribution. 3,888,231, Cl. 126-120.000.

Galluzzo, Vincent: *See—*
Galluzzo, Daniel T.; Galluzzo, Christopher G.; and Galluzzo, Vincent, 3,888,231.

Gambini, Arnaldo; and Capitelli, Giacomo, to Snam-Progetti S.p.A. Automatic carriage for radiographing weldings from the inside of pipelines by means of X-rays and relevant devices. 3,889,116, Cl. 250-320.000.

Gamblin, William E. S. Ball retrieval system. 3,888,370, Cl. 214-356.000.

Ganiaris, Neophytos, to Struthers Scientific. Spray nozzle for fluidized bed apparatus. 3,888,423, Cl. 239-567.000.

Garrison, Judd F., to John Thomas Batts, Inc. Slacks hanger. 3,888,355, Cl. 211-123.000.

Gary, William L.: *See—*
Gerace, Robert E.; Gary, William L.; and Hull, Charles J., Jr., 3,888,208.

Gaski, John Wayne, Jr., to DeGraff Products Company. Hair dryer. 3,888,018, Cl. 34-99.000.

Gates Rubber Company, The: *See—*
Bixler, William L., 3,888,014.
Russ, Paul E., Sr., 3,888,132.

Gatlin, Richard A.: *See—*
Tiner, Robert L.; Holtmyer, Marlin D.; King, Bobby J.; and Gatlin, Richard A., 3,888,312.

Gauthier, Andre, to Societe Anonyme de Telecommunications. Process of manufacture of solar cells. 3,887,995, Cl. 29-572.000.

Gauthier, Armand J. Position indicating device for attachment to a ski boot. 3,888,500, Cl. 280-11.37E.

Gautschi, Kurt, to Sodeco-Saia AG. Apparatus and method for temporarily storing sheets of paper. 3,888,267, Cl. 133-3.00R.

Gaynor, Joseph, to Bell & Howell Co. Information reproduction utilizing electret material. 3,888,174, Cl. 101-467.000.

Gea Luftkuhlergesellschaft Happel GmbH & KG: *See—*
Gerz, Hans-Bernd, 3,888,305.

Gebruder Buhler AG: *See—*
Oetiker, Hans, 3,888,389.

Geib, R. Larry, to AMP Incorporated. High voltage quick disconnect assembly. 3,888,559, Cl. 339-46.000.

Geiser, Edward M., to Universal Oil Products Company. Mold-release material. 3,888,690, Cl. 106-38.240.

Geldmacher, Donald E. Temperature measuring apparatus. 3,888,121, Cl. 73-362.00R.

Gell, Philip Anthony Maunsell; and Hann, Douglas Graeme, to Elemelt Limited. Glass melting furnaces. 3,888,650, Cl. 65-125.000.

Geller, Stephen, to Sovex Limited. Diverting arrangements for example in conveying devices. 3,888,342, Cl. 198-25.000.

General Electric Company: *See—*
Bessmer, Stanley J.; and Lampe, Warren R., 3,888,815.
Catherino, Henry A., 3,888,695.
Debesis, John R., 3,889,286.
Dills, Raymond L., 3,889,100.
Eckerle, William A., 3,888,171.
Glassburn, Larry Earl, 3,888,601.
Martin, Gary A.; and Lister, John W., 3,889,217.
McFarland, George L., 3,889,082.
Nuss, James J., 3,889,099.
Salt, Trevor L., 3,887,987.
Schneekloth, Ulrich H., 3,889,105.
Sherman, George R., 3,887,960.
Smith, James I.; and McGann, James E., 3,888,560.
Stottmann, Richard L., 3,888,166.
Tsen, Lo Kwang, 3,888,942.

General Foods Corporation: *See—*
Buide, Norma F.; Lugay, Joaquin C.; and Sims, Rex J., 3,889,001.
Cante, Charles J.; and Frost, John R., 3,889,000.
Clausi, Adolph Scott; Glicksman, Martin; and Farkas, Elizabeth, 3,889,002.

Jones, Gary V.; Pereira, John A.; and Rehman, Warren C., 3,888,999.
Mitchell, William A.; Stahl, Howard D.; and Seidel, William C., 3,889,008.
Ponzoni, George B.; and Leonard, Richard J., 3,888,859.

General Instrument Corporation: *See—*
Gibson, Richard D.; and Whelan, Robert D., 3,889,196.

General Motors Corporation: *See—*
Boyer, James A.; and Dusenberry, Charles L., 3,888,225.
Bubniak, William C.; Huellmantel, Louis W.; and Mitchell, Harry R., 3,888,458.
Bubniak, William C., 3,888,459.
Corry, Thomas M., 3,889,174.
Craig, Gale M., 3,888,111.
Eldred, Roger J., 3,888,752.
Felzer, Bertold; Brunk, Klaus; and Kraemer, Friedhelm, 3,888,502.
Florine, Robert T., 3,888,411.
Green, Raymond J.; and Stevenson, Paul D., 3,888,227.
Haas, Ronald H., 3,888,506.
Hartleroad, Ronald J.; and Grabowski, James P., 3,887,996.
Hartleroad, Ronald J.; Krajewski, James C.; and Rayon, Ronald G., 3,887,997.
Hartleroad, Ronald J.; and Grabowski, James P., 3,887,998.
Koivunen, Erkki A., 3,888,228.
Kujawa, Richard J.; and Swails, Rebecca A., 3,888,702.
Lystad, Leonard A., 3,888,044.
Mondt, James R., 3,888,223.
Stacey, Thomas A., Jr., 3,888,221.
Stordahl, Calmer M., Jr., 3,888,546.
Vernia, Peter; and Holzwarth, James C., 3,888,296.
Wallace, Michael A., 3,888,226.
Wang, Wei-Ming, 3,888,331.

General Tire & Rubber Company, The: *See—*
Hofmann, A. J., 3,888,472.
Van Gils, Gerard E.; and Kalafus, Edward F., 3,888,805.

Genin, Robert, to Jardine Industries, Inc. Physical training robot. 3,888,023, Cl. 35-29.00R.

Geometric Data Corporation: *See—*
Faulkner, Albert A., 3,888,206.

Georges, Gerard: *See—*
Deiss, Hans-Dieter; Spengler, Erich; and Georges, Gerard, 3,889,273.

Georgoudis, Paul C., to National Starch and Chemical Corporation. Stabilized polyester compositions. 3,888,817, Cl. 260-45.7PH.

Gerace, Robert E.; Gary, William L.; and Hull, Charles J., Jr., to Xerox Corporation. Image transfer process. 3,888,208, Cl. 118-637.000.

Gerber, Arthur M., to Polaroid Corporation. Radiation shield for x-ray fluorescence analytical device. 3,889,125, Cl. 250-515.000.

Gergel, Alla Nikolaevna: *See—*
Vlasenko, Natalya Andreevna; Gergel, Alla Nikolaevna; and Shkola, Andrei Antonovich, 3,889,016.

Gerhardt, Ralph August: *See—*
Bass, Merlyn Duane; and Gerhardt, Ralph August, 3,888,189.

Gerhold, Clarence G., to Universal Oil Products Company. Fluid catalytic cracking process. 3,888,762, Cl. 208-120.000.

Gerk, Richard G., to VCA Corporation. Safety closure assembly. 3,888,375, Cl. 215-219.000.

Gerk, Richard G., to VCA Corporation. Linerless closure cap. 3,888,378, Cl. 215-344.000.

Gertsch AG: *See—*
Gertsch, Ernst; and Gertsch, Ulrich, 3,888,499.
Gertsch, Ulrich; and Balass, Valentin, 3,888,498.
Gertsch, Ernst; and Gertsch, Ulrich, to Gertsch AG. Releasable ski binding. 3,888,499, Cl. 280-11.35K.
Gertsch, Ulrich; and Balass, Valentin, to Gertsch AG. Releasable ski binding. 3,888,498, Cl. 280-11.35T.

Gertsch, Ulrich: *See—*
Gertsch, Ernst; and Gertsch, Ulrich, 3,888,499.

Gerz, Hans-Bernd, to Gea Luftkuhlergesellschaft Happel GmbH & KG. Cooling tower. 3,888,305, Cl. 165-113.000.

Geul, Herman Robert, to Sun Electric Corporation. Apparatus for measuring wheel angles of vehicles, particularly motor vehicles. 3,888,592, Cl. 356-155.000.

Geyer, Paul, to Uniroyal, Inc. Extrusion mill. 3,888,469, Cl. 259-191.000.

Giacobbe, Thomas J.: *See—*
Tomalia, Donald A.; and Giacobbe, Thomas J., 3,888,847.

Giallorenzi, Thomas G.: *See—*
West, Edward J.; and Giallorenzi, Thomas G., 3,888,648.

Gibbs, David A.; and Humphries, Donald N., to Seal Incorporated. Adjustable vacuum press. 3,888,719, Cl. 156-378.000.

Gibson, Richard D.; and Whelan, Robert D., to General Instrument Corporation. VHF and UHF fiber optic channel indicia display having a common display area. 3,889,196, Cl. 325-455.000.

Gilbart-Smith, David Mervyn. Adjustable cutter for cakes and pies. 3,888,001, Cl. 30-114.000.

Gilbreth Company: *See—*
Cross, Radley; and Laessig, John, 3,888,067.

Gilleo, Kenneth B.; Evans, Francis E.; and Sogn, Allen W., to Allied Chemical Corporation. Process for increasing flame resistance of nylon and resulting flame resistant nylon composition. 3,888,822, Cl. 260-45.8NT.

Gilleo, Kenneth B.: *See—*
Evans, Francis E.; and Gilleo, Kenneth B., 3,888,819.

Gillissen, Johannes Jacobus, to Societe Honeywell Bull (Societe Anonyme). Selective storage systems. 3,889,239, Cl. 340-172.500.

Gingello, Anthony D.: *See—*
Terwilliger, James P.; Gingello, Anthony D.; and Tinney, John R., 3,888,465.

Glassburn, Larry Earl, to General Electric Company. Turbomachine with balancing means. 3,888,601, Cl. 416-144.000.

Glenn, William E. Dispensing and hood assembly for rotary tiller. 3,888,196, Cl. 111-10.000.

Gley, Paul R., to Rexnord Inc. Heavy duty tension latch. 3,887,966, Cl. 24-68.0CD.

Glicksman, Martin: *See—*
Clausi, Adolph Scott; Glicksman, Martin; and Farkas, Elizabeth, 3,889,002.

Gluzek, Karl-Heinz: *See—*
Asinger, Friedrich; Gluzek, Karl-Heinz; and Offermanns, Heribert, 3,888,923.

Goering, Lowell J., to Hesston Corporation. Control for steering, speed and direction. 3,888,135, Cl. 74-496.000.

Gogarty, William B.: *See—*
Rhudy, John S.; and Gogarty, William B., 3,888,309.

Goodwin, Robert J.: *See—*
Amundsen, Joseph; Wetzel, William H.; Naimy, Norma; and Goodwin, Robert J., 3,889,020.

Goralski, Christian T.: *See—*
Pews, R. Garth; Goralski, Christian T.; and Burk, George A., 3,888,869.

Gorby, Oliver L.; and Rice, Dennis A., to Dynamic Industries, Inc. Front end loader device. 3,888,372, Cl. 214-776.000.

Gosney, William Milton, Jr., to Texas Instruments Incorporated. Metal-insulator-semiconductor compatible charge transfer device memory system. 3,889,245, Cl. 340-173.0RC.

Goto, Toshiyuki; Kido, Kouichi; and Yamada, Akitoshi, to Matsushita Electric Industrial Co., Ltd. Feedback amplifier distortion-cancelling circuit. 3,889,060, Cl. 179-1.00F.

Gotz, Manfred K.: *See—*
Failli, Amedeo; Nelson, Verner R.; Immer, Hans U.; and Gotz, Manfred K., 3,888,840.
Immer, Hans U.; Nelson, Verner R.; and Gotz, Manfred K., 3,888,838.

Gough, Robert G., to Cincinnati Milacron Inc. Methoxy carboxylic acid ester ultraviolet stabilizers for polymers. 3,888,823, Cl. 260-45.80A.

Gowers, Jonathan Paul, to U.S. Philips Corporation. Photocathode manufacture. 3,889,143, Cl. 313-94.000.

Gowler, John Edward, to Non-Impact Surfaces Limited. Road planing machines. 3,888,542, Cl. 299-1.000.

Grabowski, James P.: *See—*
Hartleroad, Ronald J.; and Grabowski, James P., 3,887,996.
Hartleroad, Ronald J.; and Grabowski, James P., 3,887,998.

Graeff, Norwood Claude, to AMP Incorporated. Electromagnetic relay. 3,889,087, Cl. 200-246.000.

Graham, J. Wallace. Analytical method and apparatus. 3,888,628, Cl. 23-230.00B.

Graham, James Joseph, to Stanley Works, The. Utility knife. 3,888,002, Cl. 30-162.000.

Granqvist, Carl-Erik. Instrument for measuring distance. 3,888,588, Cl. 356-5.000.

Grant, John: *See—*
'Strong, Robert Edmund; Boyle, Kenneth; and Grant, John, 3,888,556.

Grau, Theodore H., to Toledo Stamping & Manufacturing Company. Apparatus for metering particulate material. 3,888,390, Cl. 222-28.000.

Gray, James R.: *See—*
Last, Bernard; Weinberger, Eugene M.; Gray, James R.; Clements, George W.; and Deffenbaugh, Ralph E., 3,888,106.

Graybill, Paul J. Oil rectifier, apparatus with process. 3,888,768, Cl. 210-223.000.

Greaney, John E. Method and apparatus for determining flow characteristics in a pipeline or the like. 3,889,120, Cl. 250-356.000.

Green, Raymond J.; and Stevenson, Paul D., to General Motors Corporation. Engine oil tank. 3,888,227, Cl. 123-196.00R.

Greene, Clifford E.: *See—*
Simokat, Frank L.; and Greene, Clifford E., 3,889,066.

Greenwald, Richard B.: *See—*
Shen, Tsung-Ying; Greenwald, Richard B.; Jones, Howard; Linn, Bruce O.; and Witzel, Bruce E., 3,888,902.

Greenwood, Arthur R., to Universal Oil Products Company. Catalyst purging technique in an on-stream catalyst regeneration process. 3,888,764, Cl. 208-140.000.

Greer, Charles B., to United States of America, Army. Magnetic system for discriminating between vehicles and personnel based upon their characteristic frequency signatures. 3,889,181, Cl. 324-41.000.

Gregord, Thomas; Filipich, Bernard; and Jancosko, William, to Vulcan Engineering Company. Work tower for relining metallurgical vessels. 3,888,062, Cl. 52-749.000.

Greune, Christian; and Hackl, Friedrich, to Motoren-und Turbinen-Union Munchen GmbH. Governing device for a gas turbine system exemplified by a vehicular or aircraft engine. 3,888,078, Cl. 60-39.28R.

Greve, Heinz Gunter; and Resag, Klaus, to Cassella Farbwerke Mainkur Akt. Cyanoalkylamino-amido benzophenones. 3,888,899, Cl. 260-465.00D.

Gribens, Joel A.; and Cogliano, Gregory P., to W. R. Grace & Co. Polyepichlorohydrin aerosol gaskets. 3,888,380, Cl. 220-81.00R.

Griffin, Earl Harris, to RCA Corporation. Analog echo protection circuit for DME. 3,889,260, Cl. 343-7.300.

Griffin, James S.: *See—*
Muraco, Paul F.; and Griffin, James S., 3,889,293.

Grill, Helmut: *See—*
Wagner, Josef; and Grill, Helmut, 3,888,994.

Grimmett, Earl S.; and Kunze, Jay F., to United States of America, Energy Research and Development Administration. Fluidized-bed nuclear reactor. 3,888,733, Cl. 176-52.000.

Griswold, Augustus W., to Xerox Corporation. Semi-automatic document handler. 3,888,582, Cl. 355-69.000.

Grosboll, Martin P.; and Edison, Robert R., to Atlantic Richfield Company. Chemical reactor having means for removing impurities from a fluid stream. 3,888,633, Cl. 23-284.000.

Gross, Franz. Transit time amplifier tube having an attenuated delay line. 3,889,148, Cl. 315-3.500.

Grosseau, Albert, to S.A. Automobiles Citroen. Devices for controlling the braking of vehicle wheels. 3,888,549, Cl. 303-21.0EB.

Grossmann, Max; Faber, Ruth; and Uhrig, Heinz, to Hoechst Aktiengesellschaft. Sulfosuccinic acid semi-esters of oxyalkylated polynuclear alkyl-phenols. 3,888,828, Cl. 260-49.000.

Groth, John Elmer, to Erico Products, Inc. Electrical connector and clip therefor having barbs to ensure proper preassembly. 3,889,048, Cl. 174-94.00R.

Groth, Rolf, to BFG Glassgroup. Heat-reflecting pane. 3,889,026, Cl. 428-34.000.

Groves, Henry Tobin, to Litton Systems, Inc. Light emitting diode module. 3,889,147, Cl. 313-500.000.

Grun Mar Industries Inc.: *See—*
Margolin, Efraim; and Grunstein, Michael, 3,888,354.

Grundy, Reed H., to Westinghouse Air Brake Company. Fail-safe circuit arrangement. 3,889,201, Cl. 330-21.000.

Grunstein, Michael: *See—*
Margolin, Efraim; and Grunstein, Michael, 3,888,354.

GTE Automatic Electric (Canada) Ltd.: *See—*
Lighthall, John T.; and Thomas, Robert W., 3,889,198.

GTE Sylvania Incorporated: *See—*
Keeffe, William M., 3,889,142.
Thompson, Wallace T., 3,889,050.

Guaglione, Giovanni Paolo; McCloud, James R.; and Aumayer, Hansruedi, to I-T-E Imperial Corporation. Gas circuit breaker insulating tube support and high pressure vessel. 3,889,083, Cl. 200-148.00B.

Guenther, Lloyd M., to Chevron Research Company. Outlet means in a thermoplastic yarn rebound texturizing apparatus. 3,887,971, Cl. 28-1.400.

Guibert, Raul. Method and apparatus for processing dough. 3,888,997, Cl. 426-27.000.

Guichard, Claude; and Soret, Jean-Claude, to Societe Anonyme: Societe Industrielle de Combustible Nucleaire. Apparatus for the continuous casting of metals and the like under vacuum. 3,888,300, Cl. 164-256.000.

Guinosso, Charles J.: *See—*
Sellstedt, John H.; Guinosso, Charles J.; and Bell, Stanley C., 3,888,858.

Gulf States Paper Corporation: *See—*
Seith, Robert T.; and Bundy, Otto M., 3,888,041.
Seith, Robert T.; and Bundy, Otto M., 3,888,197.
Seith, Robert T.; and Bundy, Otto M., 3,888,418.

Gulf & Western Manufacturing Company: *See—*
Solomon, Elias E., 3,889,250.

Gumb, Beverley William: *See—*
Morrell, Ronald Joseph; Gumb, Beverley William; and Laing, Graham Stirling, 3,889,075.

Gumprechi, William H.: *See—*
Blackwell, John; Gumprecht, William H.; and Starn, Roy Emerson, Jr., 3,888,624.

Gunter, Gordon; and Venkataramaiah, Amaraneni, to Ocean Food Inc. Aquatic animal food composition. 3,889,007, Cl. 426-74.000.

Gurski, Chester S.: *See—*
Cordi, Vincent A.; and Gurski, Chester S., 3,889,241.

Gustav Hessmert K.G.: *See—*
Hessmert, Gustav Adolf, 3,889,092.

Gutleber, Frank S., to United States of America, Army. Method and apparatus for adaptively suppressing unwanted lobes in a compressed coded radar signal. 3,889,199, Cl. 328-163.000.

Guyaux, Jean: *See—*
Deblandre, Claude; and Guyaux, Jean, 3,888,818.

H. T. Golde GmbH: *See—*
Hattass, Rainer; and Kouth, Herbert, 3,888,165.

Haacke, Gottfried Christian; and Tracey, Donald John, Jr., to American Cyanamid Company. Electrochromic voltage indicator. 3,888,565, Cl. 350-160.000.

Haagenson, Orville W.: *See—*
MacLennan, Clayton; and Haagenson, Orville W., 3,888,059.

Haas, Larry A.; Khalafalla, Sanaa E.; and McCormick, Thomas H., to United States of America, Interior. Double layer catalyst bed for removing SO_2 from waste gases. 3,888,970, Cl. 423-244.000.

Haas, Ronald H., to General Motors Corporation. Occupant knee restraint. 3,888,506, Cl. 280-150.00B.

Habert, William C., to Uniroyal, Inc. Tire building machine having a variable diameter tire building drum. 3,888,720, Cl. 156-414.000.

Habi-chek Corporation: *See—*
Symmes, Eliot Norman, 3,889,163.

Hackl, Friedrich: *See—*
Greune, Christian; and Hackl, Friedrich, 3,888,078.

Haener, Juan. Construction assembly and method including interlocking blocks. 3,888,060, Cl. 52-286.000.

Hager, Hans Jacob: *See—*
Cleeland, Roy, Jr.; and Hager, Hans Jacob, 3,888,864.

Haide, Karl, to Motoren-und-Turbinen-Union Friedrichshafen GmbH. Hydrodynamic torque converter. 3,888,082, Cl. 60-361.000.

Haisler, Melvin Roger. Gate latch. 3,888,527, Cl. 292-213.000.

Hakata, Masayuki, to Casio Computer Co., Ltd. Data storing system having single storage device. 3,889,110, Cl. 235-176.000.

Hall, Barnes R.; and Hanna, Ralph W. Lineman's tool-holding fixture. 3,888,534, Cl. 294-19.00R.

Hallet, Jack M.: *See—*
Pence, Ralph T., 3,888,445.

Halliburton Company: *See—*
Farris, Richard C., 3,888,358.
Tiner, Robert L.; Holtmyer, Marlin D.; King, Bobby J.; and Gatlin, Richard A., 3,888,312.

Hamakawa, Hiroshi; Kobari, Sadami; Shimizu, Takeshi; Fujimoto, Kentaro; Hayano, Kazuo; and Matsuda, Tetsuo, to Toyo Jozo Kabushiki Kaisha. Anti-inflammatory N,N'-disubstituted amidines. 3,888,927, Cl. 260-564.00R.

Hamilton, Brian K., to Allied Chemical Corporation. Limiting of continuous extent of inflatable restraint. 3,888,503, Cl. 280-150.0AB.

Hammann, Ingeborg: *See—*
Hoffmann, Hellmut; Hammann, Ingeborg; and Homeyer, Bernhard, 3,888,951.

Hammell, Kemper Martel, to AMP Incorporated. Electromagnetic relay assembly. 3,889,216, Cl. 335-106.000.

Hammond, Donald L.: *See—*
Burgwald, Glenn M.; Kruger, William P.; and Hammond, Donald L., 3,889,207.

Hanak, Joseph John; and Southgate, Peter David, to RCA Corporation. Energizing technique for electroluminescent devices. 3,889,151, Cl. 315-170.000.

Hananoi, Toshihiro: *See—*
Makihara, Hiroshi; Hananoi, Toshihiro; and Fujimoto, Yoshiji, 3,889,234.

Handa, Minoru: *See—*
Tanaka, Hideki; Ishida, Kazutaka; Watanabe, Mikio; Inouchi, Mitsuhiro; Yoshioka, Shigeru; Handa, Minoru; and Kitabatake, Asao, 3,889,265.

Handotai Kenkyu Shinkokai: *See—*
Nishizawa, Junichi; and Ichinose, Wasaburo, 3,889,164.

Hanke, Hans, to Daimler-Benz Aktiengesellschaft. Hydrodynamic retarder for vehicles, especially for motor vehicles. 3,888,335, Cl. 188-290.000.

Hanks, James V., to Horton Manufacturing Co. Inc. Thermal-magnetic snap action valve. 3,888,278, Cl. 137-625.650.

Hann, Douglas Graeme: *See—*
Gell, Phillip Anthony Maunsell; and Hann, Douglas Graeme, 3,888,650.

Hanna, Ralph W.: *See—*
Hall, Barnes R.; and Hanna, Ralph W., 3,888,534.

Hansen, George R., Jr.: *See—*
United States of America, National Aeronautics and Space Administration; and Hansen, George R., Jr., 3,889,264.

Hansen, Kenneth R., to Colgate-Palmolive Company. Liquid detergent composition. 3,888,798, Cl. 252-545.000.

Hanson, Walter J.; and Parups, Eriks, to Pitney-Bowes, Inc. Bursting apparatus. 3,888,399, Cl. 225-106.000.

Harada, Yoshitugu: *See—*
Nagasawa, Taro; Ono, Joji; Kudo, Tutomu; and Harada, Yoshitugu, 3,889,006.

Harken, Russell D.; and Morgan, F. Wyman, to Monsanto Company. 3-Hydroxy-p-dioxane-2-methanol. 3,888,881, Cl. 260-340.600.

Harmon, Al. Variable water volume sprinkler. 3,888,417, Cl. 239-97.000.

Harmon, James E.; Watrous, Stephen R.; and Diamond, Herrick R., to SCM Corporation. Control knob assembly. 3,887,963, Cl. 16-121.000.

Harris, Stephen W.; and Praye, Clyde A. Compression massage boot. 3,888,242, Cl. 128-64.000.

Harrison, Kenneth, to Lawrence Peska Assoc. Opthalmic dispensing device. 3,888,251, Cl. 128-233.000.

Harry Major Machine & Tool Co.: *See—*
Major, Harry, 3,888,344.

Harsco Corporation: *See—*
Treadaway, Frank G., 3,888,454.

Hartleroad, Ronald J.; and Grabowski, James P., to General Motors Corporation. Semiconductor loading apparatus for bonding. 3,887,996, Cl. 29-583.000.

Hartleroad, Ronald J.; Krajewski, James C.; and Rayon, Ronald G., to General Motors Corporation. Magnetic alignment for semiconductor device bonding. 3,887,997, Cl. 29-589.000.

Hartleroad, Ronald J.; and Grabowski, James P., to General Motors Corporation. Air-biased probe for semiconductor device bonding. 3,887,998, Cl. 29-589.000.

Hartman, Ronald L.: *See—*
Kiikka, Lauri W.; and Hartman, Ronald L., 3,888,753.

Hashimoto, Shigeru, to Canon Kabushiki Kaisha. Zoom lens structure. 3,889,282, Cl. 354-196.000.

Hasspacher, Klaus: *See—*
Bastian, Jean-Michel; and Hasspacher, Klaus, 3,888,829.

Hastings, Myron L.; and Roberts, Joseph P., to Teledyne Electro-Mechanisms. Method for connecting printed circuits. 3,888,639, Cl. 29-626.000.

Hatsukano, Yoshikazu: *See—*
Nomiya, Kosei; Hatsukano, Yoshikazu; and Minorikawa, Kazuo, 3,889,135.

Hattass, Rainer; and Kouth, Herbert, to H. T. Golde GmbH. Ventilator for a motor vehicle roof. 3,888,165, Cl. 98-2.140.

Hauni-Werke Korber & Co. KG: *See—*
Buchegger, Joachim, 3,889,240.

Havranek, Dennis D.: *See—*
O'Brien, Dennis H.; and Havranek, Dennis D., 3,888,446.

Hawkins, Gilbert L. Thermal recovery system. 3,888,084, Cl. 60-614.000.

Hawkins, Wallace H. Wrecker attachment. 3,888,368, Cl. 214-86.00A.

Hayano, Kazuo: *See—*
Hamakawa, Hiroshi, Kobari, Sadami; Shimizu, Takeshi; Fujimoto, Kentaro; Hayano, Kazuo; and Matsuda, Tetsuo, 3,888,927.

Hayashi, Mitsuo: *See—*
Mizuno, Kimio; Ando, Takuji; Tsujino, Masatoshi; Takada, Masaki; Yoshizawa, Munetoshi; Matsuda, Tetsuo; and Hayashi, Mitsuo, 3,888,843.

Hayashi, Tadashi, to Nissan Motor Company Limited. Tire air pressure sensor switch with temperature responsive bimetallic fixed contact assembly. 3,889,077, Cl. 200-61.250.

Hayashibara Biochemical Laboratories, Inc.: *See—*
Nakashio, Seizo; Sekine, Noriyuki; Toyota, Nobuhiro; and Fujita, Fumio, 3,888,809.

Hayashibara Kabushiki-Kaisha: *See—*
Okada, Shigetaka; and Kitahata, Sumio, 3,888,738.

Hayes, Douglas R., to United Aircraft Corporation. Multi-part mold clamp. 3,888,301, Cl. 164-341.000.

Haynos, Joseph Gabriel: *See—*
Lindmayer, Joseph; Curtin, Denis John; Haynos, Joseph Gabriel; and Meulenberg, Andrew, Jr., 3,888,698.

Hazelett, Robert I., Jr.: *See—*
Arnaudin, Edwin H., Jr.; Christiansen, Wilbert W.; and Hazelett, Robert I., Jr., 3,888,718.

Heaton, James W.; and Fawcett, William E., to Kennametal Inc. Method and apparatus for removing tread material from vehicle tires. 3,888,145, Cl. 82-1.00C.

Heil Co., The: *See—*
Prahst, Eugene D., 3,888,366.

Heilweil, Israel Joel: *See—*
Nnadi, John C.; and Heilweil, Israel Joel, 3,888,773.

Heimbach, Franz: *See—*
Schotten, Alfons; and Heimbach, Franz, 3,888,769.

Hein, Kurt; and Zimmer, Erich, to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung. Method of producing ball-shaped metallic oxide or metallic carbide particles. 3,888,787, Cl. 252-301.10S.

Heisinger, Robert Frederick, to Bell Telephone Laboratories, Incorporated. Protector unit. 3,889,221, Cl. 337-15.000.

Heisler, Raymond A. Apparatus and method for automatically positioning and inserting plastic plugs in a container top. 3,888,065, Cl. 53-43.000.

Hekma Advanced Machine Company: *See—*
Fitts, Robert A., 3,888,081.

Helene Curtis Industries, Inc.: *See—*
Forsberg, John R., 3,889,097.

Hendrickriem, Roland; and Dieterman, Alfred Johannes, to Emery Industries, Inc. Mixed mellitate compounds. 3,888,909, Cl. 260-475.00P.

Hendricks, Laurel A. Sanitary napkin. 3,888,254, Cl. 128-290.00R.

Herbert, Curtis B.: *See—*
Kostelnicek, Richard J.; Herbert, Curtis B.; and Crawford, Thomas H., 3,889,229.

Hercules Incorporated: *See—*
McBride, David A., 3,888,017.

Herger, Horst; and Schulz, Helmut Hasso, to U.S. Philips Corporation. Interface system with two connecting lines. 3,889,236, Cl. 340-172.500.

Hergert, Richard E.: *See—*
Parker, Joseph D., deceased; Parker, Dorothy C., executrix; Hergert, Richard E.; and Roerig, Arnold J., 3,888,729.

Herrmann, Thomas R., to Coors Container Company. Method of making a press tab container end from a metallic web. 3,888,199, Cl. 113-80.00R.

Hershberg, David E.; Chaplin, Arthur H.; and Dewland, Joseph E., to International Telephone and Telegraph Corporation. Generator for local oscillator signals. 3,889,191, Cl. 325-307.000.

Herst, Richard J., to Car Tapes Inc. Container having disappearing front panel. 3,888,494, Cl. 274-2.000.

Herzlich, Harold J.; and Fitzgerald, Paul F., to Armstrong Rubber Company, The. Molded or cast tires and methods of manufacture. 3,888,291, Cl. 152-330.00R.

Hess, Daniel E.; and Bannier, David William, to American Chain Cable Company, Inc. Tire chain tightener. 3,888,290, Cl. 152-217.000.

Hess, Frederick R.: *See—*
Knott, Sydney T.; Hess, Frederick R.; and Nowak, Richard T., 3,889,230.

Hessenmuller, Horst: *See—*
Assmus, Ulf E.; Bartel, Willy; and Hessenmuller, Horst, 3,889,235.

Hessmert, Gustav Adolf, to Gustav Hessmert K.G. Apparatus for selectively machining interfitting parts. 3,889,092, Cl. 219-69.00R.

Hesston Corporation: *See—*
Goering, Lowell J., 3,888,135.

Hewlett-Packard Company: *See—*
Burgwald, Glenn M.; Kruger, William P.; and Hammond, Donald L., 3,889,207.

Hickle, Jerry J.; and Sherbourne, Robert D., to R. L. Kuss & Co., Inc. Silo breather bag. 3,888,288, Cl. 150-1.000.

Hiersig, Heinz M., to Mannesmann-Meer Aktiengesellschaft. Planetary drive system for rolls in a mill. 3,888,138, Cl. 74-665.00G.

Higo, Toyokazu: *See—*
Yoshida, Kenji; Sekiya, Tetsuo; and Higo, Toyokazu, 3,888,403.

Higuchi, Takeru; and Uekama, Kaneto, to Alza Corporation. Ampicillin-chloral hydrate complex. 3,888,848, Cl. 260-239.100.

Hildebrand, Bernard P., to Battelle Development Corporation. Scanned holography by sector scanning. 3,889,226, Cl. 340-5.00H.

Hiler, Albert R., to Sandoz, Inc. Fluidic selector valve. 3,888,279, Cl. 137-627.000.

Hill, John B., to Becton, Dickinson and Company. Disposable hemoperfusion assembly for detoxification of blood and method therefor. 3,888,250, Cl. 128-214.00R.

Himsl, Ernst G., to Sunar Limited. Lock and interlock mechanism. 3,888,558, Cl. 312-216.000.

Hirabayashi, Yasuji: *See—*
Ogasawara, Makoto; Suzuki, Kazuyoshi; Urasaki, Takanori; Shima, Takeo; Kurisu, Shizuka; and Hirabayashi, Yasuji, 3,888,938.

Hirakawa, Tamotsu: *See—*
Watanabe, Kiyoshi; Hirakawa, Tamotsu; Takahara, Kenji; Nakamura, Yoshio; Iwasaki, Sueo; and Tanaka, Tutomu, 3,888,737.

Hiro, Yasuo: *See—*
Yamana, Hirosuke; Kunii, Tadashi; Furusawa, Tomotaka; Sugimura, Yoshihiro; Nakai, Hiroshi; and Hiro, Yasuo, 3,888,826.

Hirschman, Joel A.; and Van Winkle, Howard E., to International Business Machines Corporation. Position and velocity servo control for motor controlled article carrier and handler. 3,889,169, Cl. 318-571.000.

Hisserich, Charles A. Camshaft belt drive for variable valve timing. 3,888,217, Cl. 123-90.310.

Hitachi, Ltd.: *See—*
Isogai, Tokio; Isikawa, Eiichi; Fukushi, Keiji; Amano, Hisao; Ogata, Fumio; and Ikemoto, Norio, 3,889,175.
Koizumi, Kihachiro; Izumida, Yukihiro; and Miyata, Yoshihiko, 3,889,146.
Makihara, Hiroshi; Hananoi, Toshihiro; and Fujimoto, Yoshiji, 3,889,234.
Matsuura, Shigeo; Saitoh, Takeshi; and Miyamoto, Hiroshi, 3,889,210.
Nomiya, Kosei; Hatsukano, Yoshikazu; and Minorikawa, Kazuo, 3,889,135.
Oshima, Ryoichiro; Suginuma, Atsushi; Kishi, Atsuo; and Kawashima, Kenichi, 3,888,604.
Tamura, Hifumi; and Kondo, Toshio, 3,889,115.
Tanaka, Tsuyoshi; and Ninomiya, Hisakazu, 3,889,167.
Toriyama, Kazuhisa; Nakano, Fumio; Sato, Mikio; Abe, Hidetoshi; and Kanazaki, Mikio, 3,888,566.

Hixenbaugh, Joseph C.: *See—*
Cross, James M.; Hudson, George A.; and Hixenbaugh, Joseph C., 3,888,908.

Hoechst Aktiengesellschaft: *See—*
Arpe, Hans-Jurgen, 3,888,884.
Deucker, Walter; and Troster, Helmut, 3,888,885.
Duwel, Dieter; Diery, Helmut; and Cuntze, Ulrich, 3,888,978.
Grossmann, Max; Faber, Ruth; and Uhrig, Heinz, 3,888,828.
Kleiner, Hans-Jerg; Dursch, Walter; Stahler, Gerhard; and Racky, Werner, 3,888,930.
Meininger, Fritz; and Kohlhaas, Folker, 3,888,862.
Plettner, Wolfram, 3,888,812.
Scheibitz, Wolfgang; Staendeke, Horst; and Burkhardt, Siegfried, 3,888,971.
Spietschka, Ernst; and Landler, Josef, 3,888,841.
Troster, Helmut, 3,888,863.
Wiedemann, Wolfgang, 3,888,665.

Hoeg, Donald F., to Borg-Warner Corporation. Breath testing method. 3,888,630, Cl. 23-232.00E.

Hoffman, Klaus: *See—*
Freytag, Karl-Heinz; Meyer, Rudolf; and Hoffman, Klaus, 3,889,271.

Hoffman, Paul R., to Burroughs Corporation. Variable pitch tapeless format control system for line printers. 3,888,340, Cl. 197-133.00R.

Hoffmann, Hellmut; Hammann, Ingeborg; and Homeyer, Bernhard, to Bayer Aktiengesellschaft. O-aryl-thiono alkanephosphonic acid ester-formamidines. 3,888,951, Cl. 260-945.000.

Hoffmann, Klaus; Konig, Hans-Dieter; and Meyer, Rudolf, to Agfa-Gevaert Aktiengesellschaft. Ink jet recording material. 3,889,270, Cl. 346-1.000.

Hoffmann, Klaus: *See—*
Meyer, Rudolf; Hoffmann, Klaus; Freytag, Karl-Heinz; and Vetter, Hans, 3,889,269.

Hoffmann-La Roche Inc.: *See—*
Brossi, Arnold; and Pecherer, Benjamin, 3,888,907.
Cleeland, Roy, Jr.; and Hager, Hans Jacob, 3,888,864.
Metlesics, Werner; and Sternbach, Leo Henryk, 3,888,846.

Hofmann, A. J., to General Tire & Rubber Company, The. Suspension insert for a two-headed resilient bushing. 3,888,472, Cl. 267-57.10R.

Hohmann, Robert C., to S. J. a/k/a Agnew Environmental Products. Apparatus for cutting off sections of an elongated member. 3,888,149, Cl. 83-291.000.

Hohnecker, Otto: *See—*
Becker, John L.; Hohnecker, Otto; and Dunne, Maurice J., 3,888,361.

Hojyo, Tetsuya. Continuous and partial plating process of strip metal. 3,888,745, Cl. 204-18.00R.

Holl, Norbert, to BASF Aktiengesellschaft. Apparatus for the continuous manufacture of endless foams. 3,888,608, Cl. 425-4.00C.

Holland, Robert F.; and Peterson, Adrian J., to Black, Sivalls & Bryson, Inc. Filter-separator apparatus. 3,888,644, Cl. 55-318.000.

Hollenton, Frank; and Park, William P., to AMF Incorporated. Method and apparatus for finishing the ends of cigars. 3,888,262, Cl. 131-29.000.

Hollingsworth, Ashley J.: *See—*
Shamlian, Ralph B.; and Hollingsworth, Ashley J., 3,888,127.

Holmes, Francis Alan: *See—*
Emmerich, Werner S.; and Holmes, Francis Alan, 3,889,080.

Holmes, Jerry D.; and Moore, Samuel D., to Texas Instruments Incorporated. Navigation ranging synchronization. 3,889,258, Cl. 343-6.5LC.

Holmes, Ralph John; Wylie, Alan Wilson; and McCracken, Kenneth Gordon, to Commonwealth Scientific and Industrial Research Organization. Method and apparatus for measuring the concentration of water, iron and aluminum in iron ore by neutron radiation. 3,889,112, Cl. 250-265.000.

Holophane Company Incorporated: *See—*
Kiefer, Edward J.; and Rogers, Dale W., 3,888,583.

Holt, Lirel G.; and Holt, Max B. Tow bar. 3,888,516, Cl. 280-491.00E.

Holt, Max B.: *See—*
Holt, Lirel G.; and Holt, Max B., 3,888,516.

Holtmyer, Marlin D.: *See—*
Tiner, Robert L.; Holtmyer, Marlin D.; King, Bobby J.; and Gatlin, Richard A., 3,888,312.

Holzwarth, James C.: *See—*
Vernia, Peter; and Holzwarth, James C., 3,888,296.

Homeyer, Bernhard: *See—*
Hoffmann, Hellmut; Hammann, Ingeborg; and Homeyer, Bernhard, 3,888,951.

Honeywell Information Systems Inc.: *See—*
Blessin, Ronald W., 3,889,109.

Hood, Richard T.: *See—*
Moult, Roy H.; and Hood, Richard T., 3,888,813.

Hoover Ball and Bearing Company: *See—*
Mandusky, Jack C.; and Riddle, Neville L., 3,888,473.
Mandusky, Jack C.; and Janko, George F., 3,888,474.

Hoppough, Richard Scott; and Walker, Herbert Bryant, to Bell Telephone Laboratories, Incorporated. Detection of series-resonant circuits connected across transmission paths. 3,889,073, Cl. 179-175.20B.

Horai, John C., Jr.; and Little, David C., to GAF Corporation. Algicidal post treated roofing granules. 3,888,176, Cl. 106-15.0AF.

Horai, John C., Jr.; and Little, David C., to GAF Corporation. Novel algicidal post treated roofing granules. 3,888,683, Cl. 106-15.0AF.

Horie, Ikutaro; and Nagao, Kameji, to Fuji Photo Film Co., Ltd. Process for the rapid hardening of gelatin. 3,888,681, Cl. 96-111.000.

Horiuchi, Masao: *See—*
Ishizaki, Ayaaki; Morinaga, Yasushi; Sakakibara, Hiroyuki; and Horiuchi, Masao, 3,888,740.

Horizons Incorporated: *See—*
Rose, Selwyn H.; and Reynard, Kennard A., 3,888,799.
Wainer, Eugene, 3,889,039.

Horntvedt, Einar: *See—*
Andersson, Per-Erik; and Horntvedt, Einar, 3,888,967.

Horton Manufacturing Co. Inc.: *See—*
Hanks, James V., 3,888,278.

Horvath, William. Safety container. 3,888,350, Cl. 206-531.000.

Horwitz, James W.: *See—*
Munnerly, Charles R.; Obinson, Bruce R.; and Horwitz, James W., 3,888,569.

Hosterey, Hermann; Moller, Hans Horst; and Raabe, Ernst, to Imperial Chemical Industries Limited. Non-woven materials. 3,889,028, Cl. 428-88.000.

Hottinger, Charles F.: *See—*
Meindl, James D.; and Hottinger, Charles F., 3,888,238.

Houle, James F.: *See—*
Bailey, William J., Jr.; Houle, James F.; and Van Norman, Gilden R., 3,888,678.

Houlihan, William J.; and Nadelson, Jeffrey, to Sandoz, Inc. 7-Cyanohexahydro pleiadenes. 3,888,900, Cl. 260-465.00R.

Howell, Barbara J. Fishing hook remover. 3,888,038, Cl. 43-53.500.

Hrybyk, William L.: *See—*
Lloyd, Raymond A.; and Hrybyk, William L., 3,889,053.

Hsu, Grace F.: *See—*
Beckwith, Merton; and Hsu, Grace F., 3,888,778.

Hudson, George A.: *See—*
Cross, James M.; Hudson, George A.; and Hixenbaugh, Joseph C., 3,888,908.

Hudson, Joseph A., Jr., to Continental Oil Company. Removal of free radical inhibitors to promote synthesis of alpha, omega-dichloroalkane telomers from ethylene and sulfuryl chloride. 3,888,936, Cl. 260-659.00R.

Huellmantel, Louis W.: *See—*
Bubniak, William C.; Huellmantel, Louis W.; and Mitchell, Harry R., 3,888,458.

Hughes Aircraft Company: *See—*
Burnsweig, Joseph; and Arneson, Steven H., 3,889,212.
Egan, Georgette S., 3,889,095.

Hughes, David Owen, to African Explosives and Chemical Industries Limited. Catalyst of cobalt oxide and a rare earth metal oxide and its method of preparation. 3,888,792, Cl. 252-462.000.

Hughes, Gordon F., to Xerox Corporation. Linear motor actuator. 3,889,139, Cl. 310-13.000.

Hughes, Peter Graham; and Verge, John Pomfret, to Lilly Industries Limited. Oxazole and imidazole derivatives as antifungal agents. 3,888,984, Cl. 424-270.000.

Hull, Charles J., Jr.: *See—*
Gerace, Robert E.; Gary, William L.; and Hull, Charles J., Jr., 3,888,208.

Hultman, Bengt Goran, to Mooch Domsjo Aktiebolag. Process for determining alkali content in alkaline pulping liquor by a calorimetric measurement of the heat of partial neutralization of the pulping liquor. 3,888,726, Cl. 162-49.000.

Humphries, Donald N.: *See—*
Gibbs, David A.; and Humphries, Donald N., 3,888,719.

Hundstad, Richard L., to Westinghouse Electric Corporation. Vacuum interrupter contacts having energy dissipation surfaces. 3,889,081, Cl. 200-144.00B.

Hundstad, Richard L.: *See—*
Emmerich, Werner S.; Kimblin, Clive W.; and Hundstad, Richard L., 3,889,079.

Hunt, Loran D., Jr. Measuring devices and methods of making and using the same. 3,888,011, Cl. 33-126.500.

Hunter, Byron A.; and Barrows, Franklin H., to Uniroyal, Inc. Gas-expanding polymers using hydrazodicarboxylates. 3,888,801, Cl. 260-2.50R.

Hunter, Byron A., to Uniroyal, Inc. Oxalylbis(sulfonyl hydrazides), used as blowing agents for gas-expandable polymeric material. 3,888,802, Cl. 260-2.50R.

Hunter, Thomas C., Jr., to Standby Systems, Inc. Battery Charger. 3,889,171, Cl. 320-31.000.

Hurst, Kenneth James: *See—*
Yates, Michael Joseph; and Hurst, Kenneth James, 3,887,951.

Huss, Steven J. Lock-up housing for door lock. 3,888,096, Cl. 70-209.000.

Hyde, Robert Steven; and De Jong, Maarten Cornelis, to Stanley Works, The. Chalk line device. 3,888,010, Cl. 33-87.000.

I-T-E Corporation: *See—*
Kucharski, Leonard J., 3,889,084.

I-T-E Imperial Corporation: *See—*
Guaglione, Giovanni Paolo; McCloud, James R.; and Aumayer, Hansruedi, 3,889,083.

Ichinose, Wasaburo: *See—*
Nishizawa, Junichi; and Ichinose, Wasaburo, 3,889,164.

Ichiyanagi, Toshikazu, to Canon Kabushiki Kaisha. Exposure control computing circuit. 3,888,594, Cl. 356-226.000.

ICI Australia Limited: *See—*
Willis, Donald; Battaerd, Hendrik Adriaan Jacobus; Lang, Gunter Anton; and Weiss, Donald Eric, 3,888,928.

IDR, Inc.: *See—*
Nagel, Robert H.; and Saylor, Richard, 3,889,054.

Iinuma, Kazuhiro: *See—*
Takamizawa, Kinya; and Iinuma, Kazuhiro, 3,889,227.

Iizuka, Hiroshi; Seto, Naosuke; and Sakayanagi, Sadao, to Nippon Oil Co., Ltd. Method of recovering microbial cells containing protein. 3,888,736, Cl. 195-28.00R.

Ikemoto, Norio: *See—*
Isogai, Tokio; Isikawa, Eiichi; Fukushi, Keiji; Amano, Hisao; Ogata, Fumio; and Ikemoto, Norio, 3,889,175.

Illingworth, George E.: *See—*
Dombro, Robert A.; Illingworth, George E.; and Fronczak, Richard A., 3,888,789.

Illinois Tool Works Inc.: *See—*
Reynolds, Richard Lee, 3,888,289.
Velan, George Michael; and Peabody, Glenn Robert, 3,888,129.

Imajyo, Yasutaka: *See—*
Takano, Ikuo; Imajyo, Yasutaka; and Tanimoto, Akira, 3,889,222.

Imanishi, Hitoshi: *See—*
Yoshino, Akira; and Imanishi, Hitoshi, 3,889,215.

Immer, Hans U.; Nelson, Verner R.; and Gotz, Manfred K., to Ayerst McKenna and Harrison Ltd. Decapeptide having luteinizing hormone (lh)-and follicle stimulating hormone (fsh)-releasing activity, salts and compositions thereof, a process for preparing same, and intermediates therefor. 3,888,838, Cl. 260-112.500.

Immer, Hans U.: *See—*
Failli, Amedeo; Nelson, Verner R.; Immer, Hans U.; and Gotz, Manfred K., 3,888,840.

Imperial Chemical Industries Limited: *See—*
Clarke, William; Dawson, Timothy Leslie; and Nichols, Douglas Alan, 3,888,623.
Hosterey, Hermann; Moller, Hans Horst; and Raabe, Ernst, 3,889,028.
Schrewe, Klaus; Knipp, Ullrich; and Ravasz, Akos, 3,888,612.

Imperial Tobacco Group Limited: *See—*
Westcott, David Thomas; and Woodman, Geoffrey Roger, 3,888,160.

Industra Products, Inc.: *See—*
Walker, Robert G., 3,888,638.

Industrial Electronics Service Co.: *See—*
Cieslak, Richard F.; and Balding, John V., 3,889,256.

Industrie-Werke Karlsruhe Augsburg: *See—*
Vorgrimler, Ludwig; Vorgrimler, Klaus; and Stritt, Franz, 3,888,157.
Ing. C. Olivetti & C., S.p.A.: *See—*
Ravera, Giovanni; and Cosmo, Nicola, 3,888,147.
Sella, Lino; and Dalmasso, Claudio, 3,889,223.
Ingersoll-Rand Company: *See—*
Mahoney, Francis E., 3,888,388.
Schonewald, Roger L., 3,888,961.
Inouchi, Mitsuhiro: *See—*
Tanaka, Hideki; Ishida, Kazutaka; Watanabe, Mikio; Inouchi, Mitsuhiro; Yoshioka, Shigeru; Handa, Minoru; and Kitabatake, Asao, 3,889,265.
Inoue, Kiyoshi: *See—*
Teshima, Toru; Nagasao, Toshiie; Tanaka, Minoru; Ariga, Kazuo; and Inoue, Kiyoshi, 3,888,756.
Inoue, Naohiko: *See—*
Fukasawa, Noburu; Kitagawa, Takanori; and Inoue, Naohiko, 3,887,958.
Inoue, Yoshio; and Sato, Yasuaki, to Mitsubishi Jukogyo Kabushiki Kaisha. Unloader system. 3,888,364, Cl. 214-8.50A.
Institute of Gas Technology: *See—*
Yie, Gene G.; Cummingham, S. J.; and Rosenberg, Robert E., 3,888,652.
International Business Machines Corporation: *See—*
Cordi, Vincent A.; and Gurski, Chester S., 3,889,241.
Drimak, Edward G., 3,889,243.
Hirschman, Joel A.; and Van Winkle, Howard E., 3,889,169.
Ku, San-Mei; and Pillus, Charles A., 3,887,994.
Trindade, David Charles, 3,889,188.
International Harvester Company: *See—*
Azzarello, Joseph A.; and Di Vita, Fosco L., 3,888,316.
Berghausen, Jakob, 3,888,507.
Datta, Arthur S., 3,888,597.
International Imaging Systems: *See—*
Knight, Robert F., 3,889,055.
International Paper Company: *See—*
Burt, George A., Jr.; and Neill, William M., 3,888,395.
May, Edwin A.; Salkin, Burton; and McDonald, Harold Paul, Jr., 3,888,235.
International Standard Electric Corporation: *See—*
Petitjean, Christian H.; Marchand, Maurice E. L.; and Denis, Marcel, 3,889,214.
International Telephone and Telegraph Corporation: *See—*
Hershberg, David E.; Chaplin, Arthur H.; and Dewland, Joseph E., 3,889,191.
Jarger, Harold F., 3,888,088.
Krause, Irving A., 3,888,020.
Stewart, Alan, 3,889,072.
Tyau, Walter Fah Min, 3,889,200.
Iota Engineering Inc.: *See—*
Pierce, John T., 3,889,153.
Irvin Industries Inc.: *See—*
Bonn, Clifford; and Wilson, Kenneth R. A., 3,888,504.
Isernhagen, Fritz: *See—*
Reinecke, Erich; Isernhagen, Fritz; Klatt, Alfred; Weise, Lutz; Schlamann, Wilhelm; and Lindemann, Klaus, 3,888,550.
Ishida, Kazutaka: *See—*
Tanaka, Hideki; Ishida, Kazutaka; Watanabe, Mikio; Inouchi, Mitsuhiro; Yoshioka, Shigeru; Handa, Minoru; and Kitabatake, Asao, 3,889,265.
Ishihara, Shinya; and Suzuki, Yoshihiro, to Nippondenso Co., Ltd. Air pump. 3,889,126, Cl. 290-1.000.
Ishikawa, Teruo, to Tokyo Shibaura Electric Co., Ltd. Electronic oven with a cooking time setting mechanism and a remaining time indication mechanism. 3,889,091, Cl. 219-10.55E.
Ishikawa, Yoji, to Sony Corporation. Saddle shaped deflection coil. 3,889,218, Cl. 335-213.000.
Ishizaki, Ayaaki; Morinaga, Yasushi; Sakakibara, Hiroyuki; and Horiuchi, Masao, to Ajinomoto Co., Inc. Method for culturing hydrogen oxidizing bacterium. 3,888,740, Cl. 195-109.000.
Isikawa, Eiichi: *See—*
Isogai, Tokio; Isikawa, Eiichi; Fukushi, Keiji; Amano, Hisao; Ogata, Fumio; and Ikemoto, Norio, 3,889,175.
Isogai, Tokio; Isikawa, Eiichi; Fukushi, Keiji; Amano, Hisao; Ogata, Fumio; and Ikemoto, Norio, to Hitachi, Ltd. Driving device for thyristor type ac-dc converter. 3,889,175, Cl. 321-27.00R.
Isuge, Masami; Uematsu, Shinichi; Ono, Yotsuo; Eiga, Shokichi; and Makita, Minoru, to Asahi Kasei Kogyo Kabushiki Kaisha. Hollow fibers of cuprammonium cellulose and a process of the manufacture of same. 3,888,771, Cl. 210-500.00M.
Itagaki, Tadasi, to Pioneer Electronic Corporation. Head phone unit. 3,889,074, Cl. 179-182.00R.
Itek Corp.: *See—*
Keller, Juergen H. H., 3,888,668.
Ito, Akira; Matsuzaki, Kazuhiro; and Morimoto, Yoshio, to Mitsui Toatsu Chemicals, Incorporated. Method for the polymerization of copolymerization of ethylene. 3,888,835, Cl. 260-88.20R.
Ito, Isao: *See—*
Yamaguchi, Kazuo; Kanoh, Natsuki; Ito, Isao; and Enokido, Nobuo, 3,888,834.
Ito, Ryosuke; and Takahashi, Susumu, to Sansui Electric Co., Ltd. Four-channel reproducing system. 3,889,061, Cl. 179-1.0GQ.
Ito, Shoji, to Nittan Limited Company. Method of erasing smoke. 3,888,641, Cl. 55-84.000.
Ito, Takeo: *See—*
Suzuki, Takeshi; Tanaka, Hiroshi; Ito, Takeo; and Komatsu, Hiroaki, 3,889,145.
Ito, Yoshikazu: *See—*
Tanaka, Hiroshi; Soma, Ikuo; Ito, Yoshikazu; and Kamijo, Masayasu, 3,889,033.
Itzkan, Irving, to Avco Everett Research Laboratory, Inc. Superfluorescent laser with improved beam divergence and spacial brightness. 3,889,208, Cl. 331-94.50G.
Iwai, Shigeru: *See—*
Ando, Reijiro; and Iwai, Shigeru, 3,888,360.
Iwasaki, Sueo: *See—*
Watanabe, Kiyoshi; Hirakawa, Tamotsu; Takahara, Kenji; Nakamura, Yoshio; Iwasaki, Sueo; and Tanaka, Tutomu, 3,888,737.
Iwatani & Co., Ltd.: *See—*
Tsushima, Yakichi, 3,888,447.
Izumida, Yukihiro: *See—*
Koizumi, Kihachiro; Izumida, Yukihiro; and Miyata, Yoshihiko, 3,889,146.
J. Evans & Son (Portsmouth) Limited: *See—*
Minall, Anthony William; and Palmer, Edmond Thomas, 3,888,401.
Jablonski, Jan; and Stone, Colwyn Francis, to Elliot Brothers (London) Limited. Anti-vibration mountings. 3,888,449, Cl. 248-358.00R.
Jackman, Robert M.: *See—*
Fiser, James T.; Jackman, Robert M.; and James, Ray R., 3,888,714.
Jackson, George Oliver, to United Kingdom Atomic Energy Authority. Nuclear reactors. 3,888,730, Cl. 176-38.000.
Jackson, James P.: *See—*
Cook, Roy G.; and Jackson, James P., 3,888,257.
Jackson, Larry L.; Seifert, Walter F.; and Collins, Daniel E., to Dow Chemical Company, The. Heat transfer agents. 3,888,777, Cl. 252-73.000.
Jackson, Robert V., to McCulloch Corporation. Welding control circuit and method. 3,889,178, Cl. 323-22.0SC.
Jackson, Thomas E., to Sandoz, Inc. 2-Sulfinyl-thiazoles and oxazoles. 3,888,870, Cl. 260-302.00S.
Jago, Edward John: *See—*
Cooley, Kenton Parkes; and Jago, Edward John, 3,888,298.
Jakes, John Harry, to Marling Industries Limited. Fiber-reinforced plastic articles. 3,889,035, Cl. 428-227.000.
James, Ray R.: *See—*
Fiser, James T.; Jackman, Robert M.; and James, Ray R., 3,888,714.
James, Richard, to Lynch Corporation. Intermittent drive mechanism for glass molding table. 3,888,651, Cl. 65-361.000.
Jan van Oostrum, Karel, to U.S. Philips Corporation. Electron microscope for dark-field illumination. 3,889,114, Cl. 250-306.000.
Jancosko, William: *See—*
Gregord, Thomas; Filipich, Bernard; and Jancosko, William, 3,888,062.
Janko, George F.: *See—*
Mandusky, Jack C.; and Janko, George F., 3,888,474.
Japan Society for the Promotion of Machine Industry: *See—*
Kobayashi, Goro, 3,889,254.
Jardine Industries, Inc.: *See—*
Genin, Robert, 3,888,023.
Jaremus, Boubene M.: *See—*
Lake, Charles C.; and Jaremus, Boubene M., 3,888,008.
Jarger, Harold F., to International Telephone and Telegraph Corporation. Stabilizing attenuation of a sea water wire link. 3,888,088, Cl. 61-72.300.
Jarvinen, Uro Tapio. Headlight wiper. 3,887,955, Cl. 15-250.220.
Jarvinen, Uro Tapio; and Salminen, Olli Olavi. Headlight wiper. 3,887,957, Cl. 15-250.160.
Jean Ducros, Emile Paul Jules. Earthing joint for shielding chambers electrically and electromagnetically. 3,889,043, Cl. 174-35.0GC.
Jeffreys, Lyman Wood, to AMSTED Industries Incorporated. Top block stop for applying a longitudinal force to the top block of a pressure casting mold. 3,888,453, Cl. 249-82.000.
Jentzsch, David P.; Anderson, Hyrum T.; and Olsen, Lee J., to Rubber Engineering, Inc. High strength portable cable crossover for high tonnage earth moving vehicles. 3,888,186, Cl. 104-275.000.
Jericijo, Boris, to von Tell Trading Co. AB. Hatch battening device. 3,888,528, Cl. 292-256.500.
Jirkovsky, Ivo L., to American Home Products Corporation. Derivatives of 3-amino-2-halo-2-cyclohexen-1-one. 3,888,887, Cl. 260-347.700.
Johannessen, Paul R., to Megapulse Incorporated. Radio-frequency pulse generation system and method. 3,889,263, Cl. 343-103.000.
John Hopkins University, The: *See—*
Fischell, Robert E., 3,888,260.
John Thomas Batts, Inc.: *See—*
Garrison, Judd F., 3,888,355.
Johns-Manville Corporation: *See—*
Ostertog, Robert J.; and Page, Anthony J., 3,888,962.
Johns, Robert W. Method for mining oil shales, tar sands, and other minerals. 3,888,543, Cl. 299-11.000.
Johnson, Earl Clinton, to Deere & Company. Blade for tree shear having vertically swingable blade support arms. 3,888,287, Cl. 144-34.00E.
Johnson & Johnson: *See—*
Drelich, Arthur H.; and Lukacs, George J., 3,889,024.
Lauer, William, 3,888,246.

Johnson, Steven J.: *See—*
Alliston, William H.; and Johnson, Steven J., 3,889,106.

Johnston, Alan R.: *See—*
United States of America, National Aeronautics and Space Administration; and Johnston, Alan R., 3,888,362.

Jone, Paul Y.: *See—*
Fraser, Richard S.; Allison, Cecil J., Jr.; Caster, Richard W.; McConnel, Ronald J.; Kribich, Roland E.; and Jone, Paul Y., 3,888,715.

Jones, Everett E., to Boeing Company, The. Apparatus for die forming strip material. 3,888,618, Cl. 425-389.000.

Jones, Gary V.; Pereira, John A.; and Rehman, Warren C., to General Foods Corporation. Coffee percolator packages and method. 3,888,999, Cl. 426-77.000.

Jones, Harold Freeman: *See—*
Schevey, William Russell; Jones, Harold Freeman; and Spielman, Burton A., 3,888,693.

Jones, Howard: *See—*
Shen, Tsung-Ying; Greenwald, Richard B.; Jones, Howard; Linn, Bruce O.; and Witzel, Bruce E., 3,888,902.

Jones, James H.: *See—*
Wojtasinski, Ronald J.; Jones, James H.; and Lisle, Raymond V., 3,889,185.

Jones, Roland P., to Cast Metal Industries, Inc. Vehicle holddown. 3,888,191, Cl. 105-477.000.

Jones, Thaddeus M.; Kiwalle, Jozef; and Ruder, Ernest J., to Production Technology Inc. Quality control apparatus for inertial welding. 3,888,405, Cl. 228-2.000.

Jones, Thomas H.: *See—*
Muzyczko, Thaddeus M.; and Jones, Thomas H., 3,888,671.

Juntgen, Harald; Knoblauch, Karl; and Zundorf, Dieter, to Bergwerksverband GmbH. Process for making shaped pieces from low temperature coke of low bulk weight. 3,888,958, Cl. 264-29.000.

Jurewicz, Anthony T.: *See—*
Young, Lewis B.; Weinstein, Benjamin; and Jurewicz, Anthony T., 3,888,886.

Juric, Slavko I., to Babcock Wilcox Company, The. Compact nuclear reactor. 3,888,734, Cl. 176-61.000.

Kabel-und Metallwerke Gutehoffnungshutte AG: *See—*
Dohmann, Fritz, 3,887,978.

Kabushiki Kaisha Cosina: *See—*
Shirai, Osamu, 3,889,276.

Kabushiki Kaisha Daini Seikosha: *See—*
Ando, Reijiro; and Iwai, Shigeru, 3,888,360.

Kabushiki Kaisha Inoue Japax Kenkyusho: *See—*
Teshima, Toru; Nagasao, Toshiie; Tanaka, Minoru; Ariga, Kazuo; and Inoue, Kiyoshi, 3,888,756.

Kabushiki Kaisha Komatsu Seisakusho: *See—*
Taguchi, Kazuo; and Satake, Tadashi, 3,888,637.

Kabushiki Kaisha Suwa Seikosha: *See—*
Kurita, Masahiro, 3,888,073.
Morozumi, Shinji, 3,889,211.

Kabushikikaisha Tokyo Keiki: *See—*
Onishi, Kazutoshi; Awano, Tsuneo; and Masuzawa, Isao, 3,889,168.

Kadin, Saul B., to Pfizer Inc. Oxobenzofuran carboxamides in alleviating inflammation. 3,888,988, Cl. 424-279.000.

Kaeppeli, Viktor: *See—*
Entschel, Roland; and Kaeppeli, Viktor, 3,888,850.

Kaes, Hans-Herbert, to Ernst Leitz GmbH. Sensitized, silver-activated, phosphorus pentoxide-containing radio-photoluminescent glass and process of making same. 3,888,685, Cl. 106-47.00R.

Kahr, Olof. Component part of laminated board and a process for manufacturing such component part. 3,888,061, Cl. 52-589.000.

Kaiser Steel Corporation: *See—*
Rounds, Gerald L., 3,888,302.

Kajikawa, Saburo: *See—*
Yoshikawa, Hiromi; Sawada, Katsuo; Asanari, Shigeyuki; Kajikawa, Saburo; and Kodama, Takao, 3,888,643.

Kalafus, Edward F.: *See—*
Van Gils, Gerard E.; and Kalafus, Edward F., 3,888,805.

Kalaus, Gyorgy: *See—*
Szantay, Csaba; Szabo, Lajos; Kreidl, Janos; Kalaus, Gyorgy; Keve, Tibor; Turczanyi, Peter; Polgar, Istvan; Farkas nee Kirjak, Maria; and Lakszner, Katalin, 3,888,865.

Kalina, Alexandr Isaevich: *See—*
Chersky, Nikolai Vasilievich; Klimenko, Alexandr Petrovich; Bokserman, July Izrailevich; Kalina, Alexandr Isaevich; and Karimov, Farit Abdrakhmanovich, 3,888,434.

Kamar Incorporated: *See—*
Ware, H. Joe, 3,888,233.

Kamijo, Masayasu: *See—*
Tanaka, Hiroshi; Soma, Ikuo; Ito, Yoshikazu; and Kamijo, Masayasu, 3,889,033.

Kamiya, Minoru. Manufacturing process of a rolled gear. 3,887,979, Cl. 29-159.200.

Kamoshida, Mototaka: *See—*
Okada, Takashi; Yamagishi, Sokichi; Kamoshida, Mototaka; Satake, Tomomitsu; and Kishi, Sadayuki, 3,887,993.

Kanayama, Hikoyoshi: *See—*
Tatsumi, Testujiro; Miyamoto, Reiji; Matsui, Yutaka; Kazama, Seiji; Takemura, Tadao; and Kanayama, Hikoyoshi, 3,889,031.

Kanazaki, Mikio: *See—*
Toriyama, Kazuhisa; Nakano, Fumio; Sato, Mikio; Abe, Hidetoshi; and Kanazaki, Mikio, 3,888,566.

Kane, Rolland P. Fishing game. 3,888,489, Cl. 273-134.00B.

Kanegafuchi Chemical Industries Co., Ltd.: *See—*
Watanabe, Kiyoshi; Hirakawa, Tamotsu; Takahara, Kenji; Nakamura, Yoshio; Iwasaki, Sueo; and Tanaka, Tutomu, 3,888,737.

Kanoh, Natsuki: *See—*
Yamaguchi, Kazuo; Kanoh, Natsuki; Ito, Isao; and Enokido, Nobuo, 3,888,834.

Karimov, Farit Abdrakhmanovich: *See—*
Chersky, Nikolai Vasilievich; Klimenko, Alexandr Petrovich; Bokserman, July Izrailevich; Kalina, Alexandr Isaevich; and Karimov, Farit Abdrakhmanovich, 3,888,434.

Karl, Robert A.: *See—*
Yindra, Leonard J.; and Karl, Robert A., 3,888,444.

Karpinski, Clarence M.: *See—*
Karpinski, Medard F., 3,888,268.

Karpinski, Kenneth F.: *See—*
Karpinski, Medard F., 3,888,268.

Karpinski, Medard F., to Karpinski, Kenneth F.; and Karpinski, Clarence M. Method for reducing mercury vapor contamination of the ambient atmosphere from liquid mercury. 3,888,268, Cl. 134-4.000.

Kasai, Keiji: *See—*
Fujiwhara, Mitsuto; Kasai, Keiji; Satoh, Ryosuke; Nakagawa, Yoshinobu; and Tanigawa, Tuneo, 3,888,680.

Kasberg, Alvin H., to Atlantic Richfield Company. Spent nuclear fuel shipping casks. 3,888,794, Cl. 252-478.000.

Kasberg, Alvin H., to Atlantic Richfield Company. Uh_3 cermet. 3,888,795, Cl. 252-478.000.

Kato, Hiroyuki: *See—*
Ogasawara, Takahisa; Senzaki, Yoshimichi; Kato, Hiroyuki; and Tatemichi, Hidemaro, 3,888,830.

Kato, Yasuji: *See—*
Sasaki, Tadao; Kato, Yasuji; and Meguro, Toshiaki, 3,889,193.

Katoh, Hiroshi, to Victor Company of Japan, Ltd. Recording and/or reproducing apparatus having a reel disc device. 3,888,432, Cl. 242-201.000.

Katz, Martin; and Neiman, Herbert M., to Syntex Corporation. Fatty alcohol-propylene glycol vehicle. 3,888,995, Cl. 424-358.000.

Kaufman, Rudolph: *See—*
Thouret, Wolfgang E.; and Kaufman, Rudolph, 3,889,154.

Kawabata, Hidetoshi: *See—*
Tanaka, Susumu; Enoguchi, Yuji; and Kawabata, Hidetoshi, 3,888,394.

Kawamoto, Kensuke; Tsuno, Tomoaki; and Namiki, Teruo, to Mitsubishi Chemical Industries Ltd. Antioxidant for the aqueous solutions of sulfite and/or bisulfite of sodium or potassium and process for preventing the oxidation of said aqueous solution. 3,888,969, Cl. 423-243.000.

Kawasaki Jukogyo Kabushiki Kaisha: *See—*
Shibata, Fukuo, 3,889,127.

Kawashima, Kenichi: *See—*
Oshima, Ryoichiro; Suginuma, Atsushi; Kishi, Atsuo; and Kawashima, Kenichi, 3,888,604.

Kawneer Company, Inc.: *See—*
Meisterheim, Richard A., 3,888,046.

Kay, Malcolm John, to U.S. Philips Corporation. Circuit arrangements comprising a switching transistor. 3,889,137, Cl. 307-300.000.

Kazama, Seiji: *See—*
Tatsumi, Testujiro; Miyamoto, Reiji; Matsui, Yutaka; Kazama, Seiji; Takemura, Tadao; and Kanayama, Hikoyoshi, 3,889,031.

Keating, William J., Esq.: *See—*
Ross, Milton Dean; Folk, Kenneth Foster; and Shatto, Walter Clifton, Jr., 3,887,999.

Keeffe, William M., to GTE Sylvania Incorporated. Metal halide discharge lamp having heat reflective coating. 3,889,142, Cl. 313-44.000.

Kehler, Paul, to Applied Inventions Corporation. Wheeled bellyless vehicle. 3,888,322, Cl. 180-6.200.

Keller, Juergen H. H., to Itek Corp. Imaging medium comprising photoconductor of TiO_2 and sensitizing dye. 3,888,668, Cl. 96-1.600.

Keller, Leroy A., to Freeport Brick Company. Ladle brick for lining high temperature vessels. 3,889,029, Cl. 428-212.000.

Keller, Robert-Christian: *See—*
Baumann, Hans-Peter; and Keller, Robert-Christian, 3,888,913.

Kelly, Vincent M.; and Schrieber, Henry H. Erectable building structure junction element. 3,888,056, Cl. 52-109.000.

Kelly, William F. Jacking anchor for post-tensioning concrete. 3,888,596, Cl. 403-314.000.

Kelly, William F.: *See—*
Russell, Lewis B.; and Kelly, William F., 3,889,103.

Kelver, William L.: *See—*
Zdanys, John; and Kelver, William L., 3,889,088.

Kemanord Aktiebolag: *See—*
Stephenson, Ronald Arthur; Laursen, Bente Lissy; and Mattsson, Ove Henning, 3,888,947.

Kemlite Corporation: *See—*
Moline, Wilbur L., 3,888,359.
Morse, Donald B., 3,888,716.

Kemmetmueller, Roland, to American Waagner-Bird Company Inc. Pollution-free coal-preheating with waste heat from dry coke-quenching. 3,888,742, Cl. 201-39.000.

Kemp, Woodrow E., to Koppers Company, Inc. Wood treating solution containing creosote and antimony. 3,888,774, Cl. 252-8.100.

Kempf, Paul S. Optical comparator and inspection apparatus. 3,888,593, Cl. 356-164.000.

Kenaga, Eugene E., to Dow Chemical Company, The. Chemosterilant triaryl tin compounds. 3,888,982, Cl. 424-245.000.

Kenig, Samuel, to Canadian Industries Limited. Treatment of lignocellulosic material in an alkaline pulping liquor containing anthraquinone sulphonic acid followed by oxygen delignification. 3,888,727, Cl. 162-65.000.

Kenilworth Research & Development Corporation: *See*—
Lindo, Herbert, 3,888,412.

Kennametal Inc.: *See*—
Boeckeler, Benjamin Clark, 3,888,662.
Fawcett, William E.; and Armbrust, William D., 3,889,093.
Heaton, James W.; and Fawcett, William E., 3,888,145.
Sorice, Edward L., 3,887,974.
Sorice, Edward L.; and Friedline, Ernest J., 3,887,975.
Toews, Leonard F., 3,888,027.

Kent, Francis Joseph; and Steinbrook, Seymour E., to Wean United, Inc. Hydraulic apparatus and control for a press. 3,888,168, Cl. 100-48.000.

Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung: *See*—
Hein, Kurt; and Zimmer, Erich, 3,888,787.

Kesselring, Banks E. Vehicle tow rig. 3,888,369, Cl. 214-86.00A.

Keve, Tibor: *See*—
Szantay, Csaba; Szabo, Lajos; Kreidl, Janos; Kalaus, Gyorgy; Keve, Tibor; Turczanyi, Peter; Polgar, Istvan; Farkas nee Kirjak, Maria; and Lakszner, Katalin, 3,888,865.

Khalafalla, Sanaa E.: *See*—
Haas, Larry A.; Khalafalla, Sanaa E.; and McCormick, Thomas H., 3,888,970.

Kido, Kouichi: *See*—
Goto, Toshiyuki; Kido, Kouichi; and Yamada, Akitoshi, 3,889,060.

Kiefer, Edward J.; and Rogers, Dale W., to Holophane Company Incorporated. Illuminating system with gas discharge lamp used at low and high power levels. 3,888,583, Cl. 355-71.000.

Kiekhaefer Aeromarine Motors, Inc.: *See*—
Lohse, Lawrence L., 3,888,203.

Kiikka, Lauri W.; and Hartman, Ronald L., to Eastman Kodak Company. Coruscate electrical discharge treatment of polymeric film to improve adherability thereof to gelatinous and other coatings. 3,888,753, Cl. 204-168.000.

Kimblin, Clive W.: *See*—
Emmerich, Werner S.; Kimblin, Clive W.; and Hundstad, Richard L., 3,889,079.

Kincob Limited: *See*—
White, Berta A. I.; and Lines, William G., 3,888,009.

King, Bobby J.: *See*—
Tiner, Robert L.; Holtmyer, Marlin D.; King, Bobby J.; and Gatlin, Richard A., 3,888,312.

Kingry, Gary W.; and Lahrman, Frank H., to Procter & Gamble Company, The. Process for preparing a granular automatic dishwashing detergent composition. 3,888,781, Cl. 252-99.000.

Kinney, Thomas D.; and Pickett, John E. P., to Triangle Biomedical Equipment, Inc. Automatic electron microscopy tissue processor method. 3,889,014, Cl. 427-4.000.

Kirchner, Jack R.; and Vaughn, Lawrence G., to du Pont de Nemours, E. I., and Company. Certain 1-alkyl-9,10-anthraquinones and their 5,6,7,8-tetrahydro derivatives and the use of the latter in the production of hydrogen peroxide. 3,888,890, Cl. 260-369.000.

Kirigaya, Hitoshi: *See*—
Akiyoshi, Katsumi; Terui, Yukimasa; Kirigaya, Hitoshi; and Koyama, Haruo, 3,888,712.

Kiselev, Andrei Vladimirovich; Kustova, Galina Lvovna; Lipkind, Boris Alexandrovich; and Nikitin, Jury Stepanovich. Process for preparation of wide-pore adsorbent for use in chromatography. 3,888,972, Cl. 423-338.000.

Kishi, Atsuo: *See*—
Oshima, Ryoichiro; Suginuma, Atsushi; Kishi, Atsuo; and Kawashima, Kenichi, 3,888,604.

Kishi, Sadayuki: *See*—
Okada, Takashi; Yamagishi, Sokichi; Kamoshida, Mototaka; Satake, Tomomitsu; and Kishi, Sadayuki, 3,887,993.

Kishigami, Kunio; Kobayashi, Hiroshi; and Oshima, Shigenobu, to Babcock-Hitachi K.K. Incineration method for combustible industrial wastage and a fluidized bed furnace used therefor. 3,888,193, Cl. 110-8.00F.

Kishigami, Kunio; Kobayashi, Hiroshi; Sente, Toru; and Sugiyama, Koichi, to Babcock-Hitachi K.K. Method for incinerating industrial wastage. 3,888,194, Cl. 110-8.00F.

Kisselmann, Willy; Rumpelein, Fritz; and Kopf, Paul, to Agfa-Gevaert Aktiengesellschaft. Indicating instrument. 3,889,187, Cl. 324-114.000.

Kitabatake, Asao: *See*—
Tanaka, Hideki; Ishida, Kazutaka; Watanabe, Mikio; Inouchi, Mitsuhiro; Yoshioka, Shigeru; Handa, Minoru; and Kitabatake, Asao, 3,889,265.

Kitagawa, Takanori: *See*—
Fukasawa, Noburu; Kitagawa, Takanori; and Inoue, Naohiko, 3,887,958.

Kitahata, Sumio: *See*—
Okada, Shigetaka; and Kitahata, Sumio, 3,888,738.

Kiwalle, Jozef: *See*—
Jones, Thaddeus M.; Kiwalle, Jozef; and Ruder, Ernest J., 3,888,405.

Kizu, Ryohei; Muramatu, Tadao; and Kobayasi, Teruo, to Toyota Jidosha Kogyo Kabushiki Kaisha. Safety apparatus for steering wheel assembly. 3,888,508, Cl. 280-150.0AB.

Klar, Erhard; and Weaver, Elbert K., to SCM Corporation. Process for production of metal powders having high green strength. 3,888,657, Cl. 75-0.50B.

Klatt, Alfred: *See*—
Reinecke, Erich; Isernhagen, Fritz; Klatt, Alfred; Weise, Lutz; Schlamann, Wilhelm; and Lindemann, Klaus, 3,888,550.

Klein, Erwin: *See*—
Bigalke, Erhard; Radmann, Dietrich; Klein, Erwin; Melichar, Rainer; and Biedermann, Kurt, 3,888,220.

Klein, Haim. Fifth wheel coupling. 3,888,514, Cl. 280-434.000.

Kleiner, Hans-Jerg; Dursch, Walter; Stahler, Gerhard; and Racky, Werner, to Hoechst Aktiengesellschaft. New tertiary phosphine oxides and process for their preparation. 3,888,930, Cl. 260-606.5OP.

Klemann, Heinrich; and Leiter, Herbert, to Ernst Leitz GmbH. Electromagnetically operated photographic shutter in microphotographic mechanisms. 3,889,279, Cl. 354-79.000.

Klimenko, Alexandr Petrovich: *See*—
Chersky, Nikolai Vasilievich; Klimenko, Alexandr Petrovich; Bokserman, July Izrailevich; Kalina, Alexandr Isaevich; and Karimov, Farit Abdrakhmanovich, 3,888,434.

Kline, Larry G. Board game involving the concept of exorcism. 3,888,490, Cl. 273-134.0AD.

Klingman, Edwin E., III, to United States of America, National Aeronautics and Space Administration. Apparatus for calibrating an image dissector tube. 3,889,155, Cl. 315-369.000.

Klint, Nils J., to Uddeholms Aktiebolag. Method of making granulate. 3,888,956, Cl. 264-5.000.

Klusmann, Donald L.; Soh, Jin Y.; and Whitaker, Roger B., to Texas Instruments Incorporated. Switching regulator power supply. 3,889,173, Cl. 321-2.000.

Knight, Robert F., to International Imaging Systems. Optical method and apparatus for the area measurement of opaque objects. 3,889,055, Cl. 178-6.800.

Knipp, Ullrich: *See*—
Schrewe, Klaus; Knipp, Ullrich; and Ravasz, Akos, 3,888,612.

Knoblauch, Karl: *See*—
Juntgen, Harald; Knoblauch, Karl; and Zundorf, Dieter, 3,888,958.

Knott, Sydney T.; Hess, Frederick R.; and Nowak, Richard T., to Woods Hole Oceanographic Institution. Capacitive transducer and method of using the same. 3,889,230, Cl. 340-17.000.

Knutson, Harry: *See*—
Dench, John E.; Knutson, Harry; and Seven, Manfred K., 3,888,911.

Kobari, Sadami: *See*—
Hamakawa, Hiroshi; Kobari, Sadami; Shimizu, Takeshi; Fujimoto, Kentaro; Hayano, Kazuo; and Matsuda, Tetsuo, 3,888,927.

Kobayashi, Goro, to Oki Electric Industry Co., Ltd.; and Japan Society for the Promotion of Machine Industry. Measuring apparatus. 3,889,254, Cl. 340-347.0NT.

Kobayashi, Hiroshi: *See*—
Kishigami, Kunio; Kobayashi, Hiroshi; and Oshima, Shigenobu, 3,888,193.
Kishigami, Kunio; Kobayashi, Hiroshi; Sente, Toru; and Sugiyama, Koichi, 3,888,194.

Kobayashi, Yoshihiro: *See*—
Koizumi, Yukimichi; Kobayashi, Yoshihiro; Murase, Yasuhiro; and Kondo, Takamitsu, 3,888,775.

Kobayasi, Teruo: *See*—
Kizu, Ryohei; Muramatu, Tadao; and Kobayasi, Teruo, 3,888,508.

Kodama, Takao: *See*—
Yoshikawa, Hiromi; Sawada, Katsuo; Asanari, Shigeyuki; Kajikawa, Saburo; and Kodama, Takao, 3,888,643.

Kodate, Teiji: *See*—
Ebata, Akira; and Kodate, Teiji, 3,888,660.

Koehring Company: *See*—
Albin, Max D., 3,888,468.

Koehring GmbH - Bomag Division: *See*—
Vural, Gulertan, 3,888,600.

Koelsch, Lester Max. Foamed plastic sheet material and system for its manufacture. 3,889,032, Cl. 428-218.000.

Koff, Irwin; and Finnegan, William G., to United States of America, Navy. Particle vaporizer. 3,888,415, Cl. 239-2.00R.

Kogon, Irving Charles, to du Pont de Nemours, E. I., and Company. Curing with complexes of selected diamines and alkali metal salts. 3,888,831, Cl. 260-77.5AM.

Kohlhaas, Folker: *See*—
Meininger, Fritz; and Kohlhaas, Folker, 3,888,862.

Kohn, Gustave, administrator: *See*—
Brown, Melancthon S., deceased, 3,888,992.

Koivunen, Erkki A., to General Motors Corporation. Engine oil tank. 3,888,228, Cl. 123-196.00R.

Koizumi, Edward S. Bicycle bag. 3,888,397, Cl. 224-35.000.

Koizumi, Kihachiro; Izumida, Yukihiro; and Miyata, Yoshihiko, to Hitachi, Ltd. Electron gun assemblies for use in colour picture tubes. 3,889,146, Cl. 313-414.000.

Koizumi, Yukimichi; Kobayashi, Yoshihiro; Murase, Yasuhiro; and Kondo, Takamitsu, to Teijin Limited. Oil composition for synthetic staple fibers. 3,888,775, Cl. 252-8.800.

Kokusai Denki Kabushiki Kaisha: *See*—
Nishizawa, Junichi; and Ichinose, Wasaburo, 3,889,164.

Kolehmainen, Jack A.; and Lemieux, George E., to Ford Motor Company. Dual diaphragm actuator for a transmission throttle valve assembly. 3,888,143, Cl. 74-863.000.

Kolombos, Alexander John; McCain, Colin Christopher; and Porter, Eric Andrew, to BP Chemicals International Limited. Process for propylene oxide. 3,888,889, Cl. 260-348.500.

Komatsu, Hajime; and Mukai, Seio, to Konishiroku Photo Industry Co., Ltd.; and Chisso Corporation. Polypropylene support for photographic use. 3,888,679, Cl. 96-87.00R.

Komatsu, Hiroaki: *See—*
Suzuki, Takeshi; Tanaka, Hiroshi; Ito, Takeo; and Komatsu, Hiroaki, 3,889,145.

Kondo, Asaji: *See—*
Maekawa, Yukio; Miyano, Shizuo; Yazawa, Kenichiro; and Kondo, Asaji, 3,888,689.

Kondo, Takamitsu: *See—*
Koizumi, Yukimichi; Kobayashi, Yoshihiro; Murase, Yasuhiro; and Kondo, Takamitsu, 3,888,775.

Kondo, Toshio: *See—*
Tamura, Hifumi; and Kondo, Toshio, 3,889,115.

Konig, Hans-Dieter: *See—*
Hoffmann, Klaus; Konig, Hans-Dieter; and Meyer, Rudolf, 3,889,270.

Konishiroku Photo Industry Co., Ltd.: *See—*
Amano, Tadashi; and Andoh, Ryuichi, 3,888,580.
Fujiwhara, Mitsuto; Kasai, Keiji; Satoh, Ryosuke; Nakagawa, Yoshinobu; and Tanigawa, Tuneo, 3,888,680.
Komatsu, Hajime; and Mukai, Seio, 3,888,679.
Shindo, Masanari, 3,888,634.

Konkal, John; and Egbert, James, to La Salle Machine Tool, Inc. Pallet locating and clamping apparatus for work transfer machinery. 3,888,341, Cl. 198-19.000.

Kopf, Paul: *See—*
Kisselmann, Willy; Rumpelein, Fritz; and Kopf, Paul, 3,889,187.

Koppe, Herbert; Stahle, Helmut; Kummer, Werner; Muacevic, Gojko; and Traunecker, Werner, to Boehringer Ingelheim GmbH. N,N'-bis-(3-phenoxy-2-hydroxy-propyl)-alkenediamines and salts thereof. 3,888,898, Cl. 260-465.00E.

Koppers Company, Inc.: *See—*
Kemp, Woodrow E., 3,888,774.
Moult, Roy H.; and Hood, Richard T., 3,888,813.

Kossow, Robert G. Electric vehicle. 3,888,324, Cl. 180-21.000.

Kostelnicek, Richard J.; Herbert, Curtis B.; and Crawford, Thomas H., to Exxon Production Research Company. System for eliminating monochromatic signals from data records. 3,889,229, Cl. 340-15.5CP.

Kousens, William L. Hidden drawer and door latch. 3,888,525, Cl. 292-87.000.

Kouth, Herbert: *See—*
Hattass, Rainer; and Kouth, Herbert, 3,888,165.

Koyama, Haruo: *See—*
Akiyoshi, Katsumi; Terui, Yukimasa; Kirigaya, Hitoshi; and Koyama, Haruo, 3,888,712.

Koyama, Masao; Okada, Noboru; and Ogawa, Masahiro, to Yokohama Rubber Co., Ltd., The. System for successively splicing bias-cut pieces of rubber cloth. 3,888,717, Cl. 156-351.000.

Kraemer, Friedhelm: *See—*
Felzer, Bertold; Brunk, Klaus; and Kraemer, Friedhelm, 3,888,502.

Kraftco Corporation: *See—*
Tabernacki, Harry A., 3,888,428.

Krajewski, James C.: *See—*
Hartleroad, Ronald J.; Krajewski, James C.; and Rayon, Ronald G., 3,887,997.

Krall, Wilhelm: *See—*
Arndt, Peter Joseph; Pennewiss, Horst; Plainer, Hermann; Krall, Wilhelm; Masanek, Juergen; and Mueller, Manfred, 3,888,945.

Kramer, Thomas Rollin. Inflated containers for fluid pressurized balls. 3,888,347, Cl. 206-315.000.

Krause, Irving A., to International Telephone and Telegraph Corporation. Manikin synchronization system. 3,888,020, Cl. 35-17.000.

Kreidl, Janos: *See—*
Szantay, Csaba; Szabo, Lajos; Kreidl, Janos; Kalaus, Gyorgy; Keve, Tibor; Turczanyi, Peter; Polgar, Istvan; Farkas nee Kirjak, Maria; and Lakszner, Katalin, 3,888,865.

Krekeler, Claude B., to Cincinnati Mine Machinery Company, The. Connecting pin and retaining means therefor for mining machine trim chains and the like. 3,888,133, Cl. 74-254.000.

Krenzer, John: *See—*
Richter, Sidney B.; and Krenzer, John, 3,888,882.

Kribich, Roland E.: *See—*
Fraser, Richard S.; Allison, Cecil J., Jr.; Caster, Richard W.; McConnel, Ronald J.; Kribich, Roland E.; and Jone, Paul Y., 3,888,715.

Kropscoti, Earle L., to Dow Chemical Company, The. Polyurethane composite structures. 3,888,806, Cl. 260-33.8UB.

Kruger, William P.: *See—*
Burgwald, Glenn M.; Kruger, William P.; and Hammond, Donald L., 3,889,207.

Kruishoop, Johan Christiaan Willem: *See—*
De Leeuw, Paul; and Kruishoop, Johan Christiaan Willem, 3,888,112.

Ku, San-Mei; and Pillus, Charles A., to International Business Machines Corporation. Method of manufacturing a semiconductor device. 3,887,994, Cl. 29-571.000.

Kubach, Reinhold W., to Dayton Electronic Products Company. Method and apparatus for recording pulses representing power outages of greater than a predetermined duration on a timing track of a billing tape recorder. 3,889,289, Cl. 360-6.000.

Kubicek, Donald H., to Phillips Petroleum Company. Steam-activated olefin disproportionation catalysts. 3,888,940, Cl. 260-683.00D.

Kucharski, Leonard J., to I-T-E Corporation. Contact for high voltage gas blast circuit breaker with time-delayed opening. 3,889,084, Cl. 200-148.00R.

Kudo, Tutomu: *See—*
Nagasawa, Taro; Ono, Joji; Kudo, Tutomu; and Harada, Yoshitugu, 3,889,006.

Kuehnhanss, Gerhard O., to Ethyl Corporation. Process for reacting a sultone with a non-basic alkali metal, alkaline earth metal or ammonium halide salt in an anhydrous system. 3,888,918, Cl. 260-513.00R.

Kuhn Vierhaus & Cie. AG.: *See—*
Lenards, Gerhard; and Bahren, Walter, 3,889,034.

Kujawa, Richard J.; and Swails, Rebecca A., to General Motors Corporation. Hydrogen peroxide treatment of nickel surfaces for silicone rubber bonding. 3,888,702, Cl. 148-6.14R.

Kulseth, Leslie G., to Forsbergs, Inc. Gravity separator. 3,888,352, Cl. 209-115.000.

Kummer, Werner: *See—*
Koppe, Herbert; Stahle, Helmut; Kummer, Werner; Muacevic, Gojko; and Traunecker, Werner, 3,888,898.

Kunii, Tadashi: *See—*
Yamana, Hirosuke; Kunii, Tadashi; Furusawa, Tomotaka; Sugimura, Yoshihiro; Nakai, Hiroshi; and Hiro, Yasuo, 3,888,826.

Kuntziger, Ernest P.; and Lemmens, Nicolas, to S.A. des Anciens Etablissements Paul Wurth. Apparatus for taking gas samples in shaft furnaces. 3,888,123, Cl. 73-421.50A.

Kunze, Jay F.: *See—*
Grimmett, Earl S.; and Kunze, Jay F., 3,888,733.

Kuo, Mau H.: *See—*
Freake, Ronald; Kuo, Mau H.; and Mehta, Devendra Vaikunthlal, 3,888,741.

Kups, Edward F., to United States of America, Army. Munition control system. 3,888,181, Cl. 102-70.200.

Kurisu, Shizuka: *See—*
Ogasawara, Makoto; Suzuki, Kazuyoshi; Urasaki, Takanori; Shima, Takeo; Kurisu, Shizuka; and Hirabayashi, Yasuji, 3,888,938.

Kurita, Masahiro, to Kabushiki Kaisha Suwa Seikosha. Construction to facilitate assembly of a timepiece. 3,888,073, Cl. 58-7.000.

Kuriyama, Takayuki; and Yagi, Motohiko, to Fuji Photo Film Co., Ltd. Process for producing special filter. 3,888,646, Cl. 65-18.000.

Kurtz, Robert L., to United States of America, National Aeronautics and Space Administration. Real time, large volume, moving scene holographic camera system. 3,888,561, Cl. 350-3.500.

Kustova, Galina Lvovna: *See—*
Kiselev, Andrei Vladimirovich; Kustova, Galina Lvovna; Lipkind, Boris Alexandrovich; and Nikitin, Jury Stepanovich, 3,888,972.

Kuwabara, Seishi: *See—*
Tsumita, Toru; and Kuwabara, Seishi, 3,888,837.

Kuwayama, Shigeo, to Fuji Photo Film Co., Ltd. Flint optical glass. 3,888,692, Cl. 106-53.000.

Kuwayama, Shigeo; and Yagi, Motohiko, to Fuji Photo Film Co., Ltd. Method of making top plates for range. 3,889,021, Cl. 427-376.000.

Kuwubara, Haruo: *See—*
Atsukawa, Masumi; Shinoda, Naoharu; and Kuwubara, Haruo, 3,888,968.

Kwolek, Stephanie Louise, to du Pont de Nemours, E. I., and Company. Method of increasing the initial modulus and reducing the orientation angle of undrawn poly (para-benzamide) fibers. 3,888,965, Cl. 264-342.0RE.

Kyriacou, Demetrios, to Dow Chemical Company, The. Preparation of chloropyridylsulfone-n-oxides. 3,888,868, Cl. 260-294.80F.

La Citrique Belge, N.V.: *See—*
Smeets, Fred, 3,888,910.

La Salle Machine Tool, Inc.: *See—*
Konkal, John; and Egbert, James, 3,888,341.

La Telemecanique Electrique: *See—*
Nguyen Van, Trong, 3,889,165.

Labana, Santokh S.; and Theodore, Ares N., to Ford Motor Company. Powder coating compositions comprising a blend of coreactive polymers - I. 3,888,943, Cl. 260-836.000.

Lacey, Robert R., to Universal Oil Products Company. Vehicle seats. 3,888,451, Cl. 248-399.000.

Ladlow, Frank Willows. Fruit and vegetable cutting devices. 3,888,000, Cl. 30-114.000.

Laessig, John: *See—*
Cross, Radley; and Laessig, John, 3,888,067.

Lafond, Gerard L. Carriers for pirns and other articles. 3,888,537, Cl. 294-93.000.

Laforet, Henry A.; and Zusack, Michael J., to American Motors Corporation. Method of making a foundry core. 3,888,293, Cl. 164-16.000.

Lahrman, Frank H.: *See—*
Kingry, Gary W.; and Lahrman, Frank H., 3,888,781.

Laine, Michel. Removable interchangeable holder device for a recorder tape. 3,888,431, Cl. 242-194.000.

Laing, Graham Stirling: *See—*
Morrell, Ronald Joseph; Gumb, Beverley William; and Laing, Graham Stirling, 3,889,075.

Laing, Nikolaus. Temperature-control system using thermosipon effect. 3,888,304, Cl. 165-86.000.

Laird, Robert A.: *See—*
Anderson, Clarence A. F.; and Laird, Robert A., 3,888,557.

Lake, Charles C.; and Jaremus, Boubene M., to American Hospital Supply Corporation. Handpiece and chuck wrench therefor. 3,888,008, Cl. 32-27.000.

Lakszner, Katalin: *See*—
Szantay, Csaba; Szabo, Lajos; Kreidl, Janos; Kalaus, Gyorgy; Keve, Tibor; Turczanyi, Peter; Polgar, Istvan; Farkas nee Kirjak, Maria; and Lakszner, Katalin, 3,888,865.

Lampe, Warren R.: *See*—
Bessmer, Stanley J.; and Lampe, Warren R., 3,888,815.

Lancaster, Raymond L., to Lanson Industries, Inc. Container for suspending a bomb-like member. 3,888,346, Cl. 206-3.000.

Landler, Josef: *See*—
Spietschka, Ernst; and Landler, Josef, 3,888,841.

Landsberg, Ernst, to Walther & Cie Aktiengesellschaft. Sprinkler system. 3,888,314, Cl. 169-20.000.

Lang, Gunter Anton: *See*—
Willis, Donald; Battaerd, Hendrik Adriaan Jacobus; Lang, Gunter Anton; and Weiss, Donald Eric, 3,888,928.

Langer, Horst G.; and Ayers, Earl D., to Dow Chemical Company, The. Differential thermal analysis cell assembly. 3,888,107, Cl. 73-15.00B.

Lanson Industries, Inc.: *See*—
Lancaster, Raymond L., 3,888,346.

Lapeyre, Fernand S. Adjustable pedal and crank system for foot propelled vehicles. 3,888,136, Cl. 74-594.100.

Larner, Donald Alexander, to Fluid Devices Limited. Solenoid actuator with magnetic latching. 3,889,219, Cl. 335-234.000.

Larrimer, Walter H., Jr.; and Duncan, Donald L., to Boeing Company, The. Liquid metal core transpactor elements for electromagnetic forming tools. 3,888,098, Cl. 72-56.000.

Larsen, Duane M., to ESB Incorporated. Absorbent separator for an electric battery. 3,888,700, Cl. 136-146.000.

Larson, Robin J., to United States of America, Army. All digital phase detector and corrector. 3,889,186, Cl. 324-83.00D.

Larsonneur, Jean-Francois, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Pyrotechnical jacks. 3,888,085, Cl. 60-635.000.

Larsson, Sten Herbert. Actuation device for the weft inserter rod of a loom having two parallel loom bodies. 3,888,272, Cl. 139-123.000.

Laskin, Hyman: *See*—
Laskin, Sondra; and Laskin, Hyman, 3,887,946.

Laskin, Sondra; and Laskin, Hyman. Foot covering. 3,887,946, Cl. 2-239.000.

Last, Bernard; Weinberger, Eugene M.; Gray, James R.; Clements, George W.; and Deffenbaugh, Ralph E., to Rockwell International Corporation. Testing apparatus for flow measuring devices. 3,888,106, Cl. 73-3.000.

Lauer, William, to Johnson & Johnson. Anti-fog surgical face mask. 3,888,246, Cl. 128-146.200.

Laursen, Bente Lissy: *See*—
Stephenson, Ronald Arthur; Laursen, Bente Lissy; and Mattsson, Ove Henning, 3,888,947.

Lavarini, Bernard, to Compagnie Generale d'Electricite. Gaseous flux laser oscillator. 3,889,209, Cl. 331-94.50G.

Lawrence Peska Assoc.: *See*—
Harrison, Kenneth, 3,888,251.

Lebold, Steve. Means for supporting a limb in relaxed position. 3,888,244, Cl. 128-77.000.

Lebow, Marvin E. Viewing system providing compatability between two dimensional pictures and three dimensional viewing thereof. 3,888,564, Cl. 350-138.000.

Le Brun, Clarence A. Fireplace shutoff. 3,888,232, Cl. 126-140.000.

Leco Corporation: *See*—
Wiiki, Leroy E.; and Sitek, George J., 3,888,321.

Leco Industries Limited: *See*—
Saint Eve, Daniel R.; and Bose, Ajit Kumar, 3,888,609.

Lecoco, David E.: *See*—
Franz, Helmut; and Lecoco, David E., 3,889,017.

Leder, Lewis B., to Xerox Corporation. Liquid crystalline compounds. 3,888,892, Cl. 260-397.200.

Ledex, Inc.: *See*—
Myers, John L., 3,889,162.

Lednicer, Daniel; and Nishizawa, Edward E., to Upjohn Company, The. Method for binding antithrombotic or anticlotting substances to a susceptible material involving the use of an aromatic sulfonyl nitrene. 3,888,833, Cl. 260-79.30R.

Lee, Lieng Huang, to Xerox Corporation. Heterophase adhesive compositions containing polysulfone for metal-selenium composites. 3,888,667, Cl. 96-1.500.

Lee, Poy. Winter emergency brake system. 3,888,524, Cl. 291-15.000.

Lee, Shung-Yan Luke, to du Pont de Nemours, E. I., and Company. Photopolymerizable process capable of yielding a reverse image. 3,888,672, Cl. 96-35.100.

Leeds & Northrup Company: *See*—
Miller, Roger L., 3,889,275.

Legg, Leo V.; and Tijunelis, Donatas. Submersible cable. 3,889,049, Cl. 174-102.00R.

Legler, Ernst, to Robert Bosch Fernsehanlagen G.m.b.H. Method and system for transmitting signals from a selected one of a plurality of video sources in a central apparatus room and the associated audio and control signals to at least one television studio. 3,889,051, Cl. 178-5.600.

Lehn, Jean-Marie, to Schering Corporation. Macrocyclic compounds and complexes thereof. 3,888,877, Cl. 260-327.00R.

Leiber, Heinz, to Teldix GmbH. Arrangement for compensating yawing moments. 3,888,328, Cl. 180-79.20R.

Leifheit, Gunter, to Leifheit International Gunter Leifheit GmbH. Stand for storage of shoes. 3,888,353, Cl. 211-37.000.

Leifheit International Gunter Leifheit GmbH: *See*—
Leifheit, Gunter, 3,888,353.

Leisenberg, Wolfgang, to Manfred Leisenberg KG Industrifeuerungen. Method and apparatus for automatically regulating the plasticity of ceramic material. 3,888,470, Cl. 259-191.000.

Leiter, Herbert: *See*—
Klemann, Heinrich; and Leiter, Herbert, 3,889,279.

Lelaidier, Daniel; and Quobex, Jean, to Saft-Societe des Accumulateurs Fixes et de Traction. Method and apparatus for limiting charge of a storage battery charged at a constant voltage. 3,889,172, Cl. 320-39.000.

Lemieux, George E.: *See*—
Kolehmainen, Jack A.; and Lemieux, George E., 3,888,143.

Lemmens, Nicolas: *See*—
Kuntziger, Ernest P.; and Lemmens, Nicolas, 3,888,123.

Lemmons, Douglas: *See*—
Berntson, E. Boyd; and Lemmons, Douglas, 3,888,245.

Lenards, Gerhard; and Bahren, Walter, to Kuhn Vierhaus & Cie. AG. Chenille yarn and method of making same. 3,889,034, Cl. 428-372.000.

Leonard, Richard J.: *See*—
Ponzoni, George B.; and Leonard, Richard J., 3,888,859.

Leonard, Verna M. Finger pattern indicator. 3,888,155, Cl. 84-471.000.

Les Fabriques d'Assortiments Reunies: *See*—
Droz, Rene, 3,888,012.

Lescoa, Inc.: *See*—
Wind, Harold, 3,887,956.

Lessoff, Howard: *See*—
Vittoria, Carmine; Pasternak, Joseph; and Lessoff, Howard, 3,889,213.

Leute, Richard K.; and Bolz, Gunner, to Syva Company. Nitrogen derivatives of benzoyl ecgonine. 3,888,866, Cl. 260-292.000.

Lever Brothers Company: *See*—
Brammer, Klaus-Rudiger; and Wieske, Theophil, 3,889,005.
Read, Colin Barrington, 3,889,011.
Schmidt, Heinrich Gottlieb; Strauss, Kunc Gustav; and Tennikat, Josef, 3,889,004.

Levitt, Albert P.; and Di Cesare, Eugene, to United States of America, Army. Production of graphite fiber reinforced metal matrix composites. 3,888,661, Cl. 75-201.000.

Levy, Leon B.; and Fisher, Gene J., to Celanese Corporation. Stabilizing acrylic acid with alkylated phenols. 3,888,922, Cl. 260-526.00N.

Lewis, Gerald F.: *See*—
Totten, Ralph P.; and Lewis, Gerald F., 3,888,035.

Lewis, Warren F., to Minnesota Mining and Manufacturing Company. Pressure sensor and instrument utilizing same. 3,888,117, Cl. 73-141.00A.

Ley, Gordon S.: *See*—
Rushing, Frank C.; and Ley, Gordon S., 3,888,562.

Licentia-Patent-Verwaltungs-G.m.b.H.: *See*—
Bogus, Klaus; and Mattes, Siegfried, 3,888,697.

Liddall, Jack Anthony, to Linac Systems International Ltd. Service columns. 3,888,282, Cl. 138-106.000.

Liebrecht, Francis M., heir: *See*—
Liebrecht, Lawrence S., deceased; and Liebrecht, Francis M., heir, 3,888,396.

Liebrecht, Lawrence S., deceased; and by Liebrecht, Francis M., heir. Sewing machine needle threader. 3,888,396, Cl. 223-99.000.

Liegois, William A.: *See*—
Colwell, Robert E.; Liegois, William A.; Wilks, Gerald W.; and Vrcelj, Mihailo J., 3,888,973.

Lightfoot, Robert Oscar: *See*—
White, Robert Eric; and Lightfoot, Robert Oscar, 3,888,070.

Lighthall, John T.; and Thomas, Robert W., to GTE Automatic Electric (Canada) Ltd. Voltage waveform generator including feedback arrangement for restoring voltage to initial condition. 3,889,198, Cl. 328-59.000.

Lilly Industries Limited: *See*—
Hughes, Peter Graham; and Verge, John Pomfret, 3,888,984.

Lin, A. Oscar. Scented writing instrument. 3,888,416, Cl. 239-34.000.

Linac Systems International Ltd.: *See*—
Liddall, Jack Anthony, 3,888,282.

Lindemann, Klaus: *See*—
Reinecke, Erich; Isernhagen, Fritz; Klatt, Alfred; Weise, Lutz; Schlamann, Wilhelm; and Lindemann, Klaus, 3,888,550.

Lindmayer, Joseph; Curtin, Denis John; Haynos, Joseph Gabriel; and Meulenberg, Andrew, Jr., to Communications Satellite Corporation. Infrared-transparent solar cell. 3,888,698, Cl. 136-89.000.

Lindo, Herbert, to Kenilworth Research & Development Corporation. Apparatus for heating the fluid in a windshield washer system. 3,888,412, Cl. 237-12.30B.

Lindstedt, Per Olof, to Olof Lindstedt & Co. AB. Methods of treating hardening oil before use by adding a mixture of ethoxylated acyclic compounds and film-forming acyclic compounds. 3,888,704, Cl. 148-29.000.

Lines, William G.: *See*—
White, Berta A. I.; and Lines, William G., 3,888,009.

Link, Timothy H. Fender guard. 3,888,532, Cl. 293-62.000.

Linn, Bruce O.: *See*—
Shen, Tsung-Ying; Greenwald, Richard B.; Jones, Howard; Linn, Bruce O.; and Witzel, Bruce E., 3,888,902.

Lipha, Lyonnaise Industrielle Pharmaceutique: *See*—
Boschetti, Eugene; Molho, Darius; and Fontaine, Louis, 3,888,993.

Lipkind, Boris Alexandrovich: *See*—
Kiselev, Andrei Vladimirovich; Kustova, Galina Lvovna; Lipkind, Boris Alexandrovich; and Nikitin, Jury Stepanovich, 3,888,972.

Lipoma, Samuel P. Method for continuous electromagnetic sterilization of food in a pressure zone. 3,889,009, Cl. 426-234.000.

Lippmann, Wilbur, to Ayerst McKenna and Harrison Ltd. Method and composition for lowering intraocular pressure. 3,888,985, Cl. 424-275.000.

Lippmann, Wilbur, to Ayerst McKenna and Harrison Ltd. Method and composition for lowering intraocular pressure. 3,888,991, Cl. 424-285.000.

Lisle, Raymond V.: *See*—
Wojtasinski, Ronald J.; Jones, James H.; and Lisle, Raymond V., 3,889,185.

Lister, John W.: *See*—
Martin, Gary A.; and Lister, John W., 3,889,217.

Litman, Mitchel. Photo electric ambiant light operated surveillance device. 3,889,251, Cl. 340-279.000.

Little, David C., to GAF Corporation. Algicidal roofing granules. 3,888,684, Cl. 106-15.0AF.

Little, David C.: *See*—
Horai, John C., Jr.; and Little, David C., 3,888,176.
Horai, John C., Jr.; and Little, David C., 3,888,683.

Litton Systems, Inc.: *See*—
Bodine, Richard Hill, Jr.; and Rosiak, Marion, 3,889,152.
Groves, Henry Tobin, 3,889,147.

Livesey, James R.: *See*—
Adickes, Fred; Livesey, James R.; Weir, George; Bailey, Dennis; and Mehelich, John J., 3,888,483.

Lloyd, Raymond A.; and Hrybyk, William L., to Westinghouse Electric Corporation. Contactless test system. 3,889,053, Cl. 178-6.000.

Lobeck, Walter G., Jr.: *See*—
Wu, Yao Hua; and Lobeck, Walter G., Jr., 3,888,852.

Lockard, Joseph Larue, to AMP Incorporated. Slide switch with retraction features. 3,888,807, Cl. 200-16.00R.

Lockard, Joseph LaRue, to AMP Incorporated. Rest mechanism for manually operated number wheels carrying indicia tape. 3,889,085, Cl. 200-153.00R.

Lockheed Aircraft Corporation: *See*—
Carver, David, 3,889,047.
Davis, John E.; and Bulgrin, Wayne E., 3,889,071.
Villani, Vincent; and Topp, Ronald L., 3,888,691.

Lode, Tenny D. Digital time measurement system. 3,889,189, Cl. 324-186.000.

Logsdon, John. Securing of service lines in hollow boat masts. 3,889,045, Cl. 174-70.00R.

Lohse, Lawrence L., to Kiekhaefer Aeromarine Motors, Inc. Stern drive for boats. 3,888,203, Cl. 115-41.0HT.

Lonati, Francesco, to Construzioni Meccaniche Lonati di Lonati Francesco & Figli (Ettore, Fausto, Tiberio) S.n.c. Drive unit for operating and cutting out the additional thread supplies and associated thread guides on dual cylinder circular knitting machines. 3,888,094, Cl. 66-138.000.

Long, John W.: *See*—
Yates, Jack; and Long, John W., 3,887,980.

Long, William R. Bulk tobacco rack. 3,888,533, Cl. 294-5.500.

Longenecker, Levi S. Panelized suspended basic furnace roof. 3,888,195, Cl. 110-99.00R.

Loopco Industries, Inc.: *See*—
Costello, Anthony C.; and Shaffer, Leon L., 3,888,430.

Lorenz, Dieter: *See*—
Olsen, Willi; Lorenz, Dieter; and Beer, Heinz, 3,889,076.

Lou, David Yuan Kong; and Willens, Ronald Howard, to Bell Telephone Laboratories, Incorporated. Metal film recording media for laser writing. 3,889,272, Cl. 346-1.000.

Lougheed, James Hugh: *See*—
Zimmermann, Detlef; Lougheed, James Hugh; and Crompton, Eric John, 3,889,262.

Loughry, Don J., to Dart Industries Inc. Vertical synchronization time base error corrector. 3,888,385, Cl. 360-11.000.

Lowe, James L., to Boots Co., Ltd., The. Process for the preparation of 4-chloro-2-hydroxybenzothiazole. 3,888,871, Cl. 260-304.000.

Lu, Brun & Associes S.A.: *See*—
Riviere, Jacques; and Simon, Raymond, 3,889,012.

Lucas, David Adrian; and Vincent, Richard Paul, to U.S. Philips Corporation. Radio interferometer. 3,889,267, Cl. 343-113.00R.

Lucas, Theodore W., Jr.: *See*—
Fritz, Jack J.; and Lucas, Theodore W., Jr., 3,888,632.

Lucian, Arsene N. Transducers utilizing electrocapillary action. 3,889,086, Cl. 200-192.000.

Lugay, Joaquin C.: *See*—
Buide, Norma F.; Lugay, Joaquin C.; and Sims, Rex J., 3,889,001.

Luhdorff, Dieter, to Westinghouse Bremsen-und Apparatebau GmbH. Variable threshold electronic rate detection system for wheel skid control. 3,889,128, Cl. 307-9.000.

Lukacs, George J.: *See*—
Drelich, Arthur H.; and Lukacs, George J., 3,889,024.

Lundquist, Jerry R.: *See*—
Stromatt, Robert W.; and Lundquist, Jerry R., 3,888,744.

Lynam, John Edward, to Automatic Braiding Co. (Nottingham) Ltd. Composite elastic band for use with a garment. 3,887,968, Cl. 24-266.000.

Lynch Corporation: *See*—
James, Richard, 3,888,651.

Lystad, Leonard A., to General Motors Corporation. Folding stabilizer linkage for vehicle window. 3,888,044, Cl. 49-227.000.

MacFarland, Raymond W., Jr. Display package. 3,888,349, Cl. 206-457.000.

Mack, Bernard. Endless loop magnetic tape cartridge with removable tape guide insert. 3,888,429, Cl. 242-55.19A.

Mack, Richard B. Bicycle pedal-actuated brake and freewheel system. 3,888,334, Cl. 188-24.000.

Mackelvie, Philip A., to Multi-Point Tool Co., Inc. Indexing turret. 3,888,140, Cl. 74-826.000.

Mackenzie, Raymond W., to Westinghouse Electric Corporation. Induction heat cooking apparatus. 3,889,090, Cl. 219-10.490.

MacLennan, Clayton; and Haagenson, Orville W. Partition wall construction. 3,888,059, Cl. 52-241.000.

MacSween, George. Apparatus for grinding rock bit inserts. 3,888,049, Cl. 51-54.000.

Maddox, Leland D.: *See*—
Pierce, Edwin F.; Roberts, Larry W.; and Maddox, Leland D., 3,888,069.

Maeda, Kazuo, to Mitsui Shipbuilding and Engineering Co., Ltd. Turntable. 3,888,184, Cl. 104-37.000.

Maekawa, Yukio; Miyano, Shizuo; Yazawa, Kenichiro; and Kondo, Asaji, to Fuji Photo Film Co., Ltd. Aqueous printing ink containing perfume-containing microcapsules. 3,888,689, Cl. 106-24.000.

Maenner, Paul. Apparatus for generating proportional cams from a master cam. 3,888,162, Cl. 90-13.100.

Mahoney, Francis E., to Ingersoll-Rand Company. Apparatus and methods for controlling injection rams. 3,888,388, Cl. 222-1.000.

Maier, Paul E. Fuel-air mixture contrc' 3,888,215, Cl. 123-32.0EA.

Major, Harry, to Harry Major Machine & Tool Co. Accumulating conveyor with article position sensors and article movement sensors controlling the pusher member. 3,888,344, Cl. 198-219.000.

Makihara, Hiroshi; Hananoi, Toshihiro; and Fujimoto, Yoshiji, to Hitachi, Ltd. Feature extractor of character and figure. 3,889,234, Cl. 340-146.3MA.

Makita, Minoru: *See*—
Isuge, Masami; Uematsu, Shinichi; Ono, Yotsuo; Eiga, Shokichi; and Makita, Minoru, 3,888,771.

Malanka, Douglas Peter: *See*—
Pighin, Albert; and Malanka, Douglas Peter, 3,888,784.

Malmer, Michael M., Jr., to Burroughs Corporation. Modifiable computer function decoder. 3,889,242, Cl. 340-172.500.

Mandusky, Jack C.; and Riddle, Neville L., to Hoover Ball and Bearing Company. Seat spring assembly. 3,888,473, Cl. 267-102.000.

Mandusky, Jack C.; and Janko, George F., to Hoover Ball and Bearing Company. Frame and spring assembly for furniture and the like. 3,888,474, Cl. 267-110.000.

Manfred Leisenberg KG Industrifeuerungen: *See*—
Leisenberg, Wolfgang, 3,888,470.

Manigault, Edward L., to Chas. Taylor's Sons Co., The. Aluminachrome refractory. 3,888,687, Cl. 106-66.000.

Mann, Herbert: *See*—
Broll, Arno; and Mann, Herbert, 3,888,688.

Mannesmann-Meer Aktiengesellschaft: *See*—
Hiersig, Heinz M., 3,888,138.

Manning, Andrew J.; and Ram, Michael J., to Celanese Corporation. Production of titanium acetylacetonate bis(dimethylamine). 3,888,895, Cl. 260-429.500.

Manning, Robert E., to Sandoz, Inc. 1,2,5,6-Tetrahydropyridines. 3,888,853, Cl. 260-247.10M.

Marathon Oil Company: *See*—
Fentress, Denton C.; and Robinson, Kent W., 3,888,917
Rhudy, John S.; and Gogarty, William B., 3,888,309.

Marchand, Maurice E. L.: *See*—
Petitjean, Christian H.; Marchand, Maurice E. L.; and Denis, Marcel, 3,889,214.

Margolin, Efraim; and Grunstein, Michael, to Grun Mar Industries Inc. Adjustable bracket assembly. 3,888,354, Cl. 211-110.000.

Marine Protein Corporation: *See*—
Buss, Keen W., 3,888,210.

Marling Industries Limited: *See*—
Jakes, John Harry, 3,889,035.

Mars, William T., to McNeil Corporation. Electronic indexing system. 3,888,338, Cl. 192-142.000.

Martin, Elmore Louis, to du Pont de Nemours, E. I., and Company. Cyano-and cyanomethyl-benzensulfonamides. 3,888,897, Cl. 260-465.00E.

Martin Engineering Co.: *See*—
Fischer, Peter Augustus, 3,888,960.

Martin, Gary A.; and Lister, John W., to General Electric Company. Convergence means for inline-type cathode ray tube. 3,889,217, Cl. 335-212.000.

Maruko, Saburo. Connection device. 3,888,955, Cl. 261-99.000.

Marumo, Hideo, to Carapus Company, Limited. Detergent composition. 3,888,797, Cl. 252-527.000.

Marx, Gunter. Apparatus for measuring a quanity of urine. 3,888,236, Cl. 128-2.00F.

Marzocchi, Alfred, to Owens-Corning Fiberglas Corporation. Treatment of glass fibers. 3,888,645, Cl. 65-3.000.

Masanek, Juergen: *See*—
Arndt, Peter Joseph; Pennewiss, Horst; Plainer, Hermann; Krall, Wilhelm; Masanek, Juergen; and Mueller, Manfred, 3,888,945.

Mase, Shunzo; and Watanabe, Tetsuo, to NGK Insulators Ltd. Multilayer metallized beryllia ceramics and a method for producing the same. 3,889,041, Cl. 428-472.000.

Maselli, Nicholas F., to Western Electric Company, Incorporated. Method for abrasive cutting in a liquid. 3,888,054, Cl. 51-319.000.

Maske, Robert L. Step for motor vehicle. 3,888,510, Cl. 280-166.000.

Massa, Andrew Leo: *See—*
Downs, John D.; and Massa, Andrew Leo, 3,888,808.

Massachusetts Institute of Technology: *See—*
Spinella, Rinaldo A., 3,888,116.
Wilson, David G., 3,888,351.

Massey-Ferguson Inc.: *See—*
Elfes, Lee E.; and Mueller, Otto, Jr., 3,888,315.

Masuzawa, Isao: *See—*
Onishi, Kazutoshi; Awano, Tsuneo; and Masuzawa, Isao, 3,889,168.

Mather, Selwyn R.: *See—*
Chalex, Paul; and Mather, Selwyn R., 3,888,814.

Matsuda, Mutsuhide: *See—*
Taguchi, Tetsuya; Yazaki, Mutsunobu; and Matsuda, Mutsuhide, 3,889,281.

Matsuda, Tetsuo: *See—*
Hamakawa, Hiroshi; Kobari, Sadami; Shimizu, Takeshi; Fujimoto, Kentaro; Hayano, Kazuo; and Matsuda, Tetsuo, 3,888,927.
Mizuno, Kimio; Ando, Takuji; Tsujino, Masatoshi; Takada, Masaki; Yoshizawa, Munetoshi; Matsuda, Tetsuo; and Hayashi, Mitsuo, 3,888,843.

Matsui, Yutaka: *See—*
Tatsumi, Testujiro; Miyamoto, Reiji; Matsui, Yutaka; Kazama, Seiji; Takemura, Tadao; and Kanayama, Hikoyoshi, 3,889,031.

Matsumoto, Seiji; and Tamai, Vasuo, to Rank Xerox, Limited. Reversal developing method using photoconductive developing electrode. 3,888,666, Cl. 96-1.00R.

Matsuo, Susumu. Apparatus for separation of air and dust. 3,887,959, Cl. 15-347.000.

Matsushita Electric Industrial Co., Ltd.: *See—*
Goto, Toshiyuki; Kido, Kouichi; and Yamada, Akitoshi, 3,889,060.
Oka, Shunzo; and Minami, Shunji, 3,889,133.
Yamamoto, Osamu; Takenaga, Mutsuo; and Tsujimoto, Yoshinobu, 3,889,124.
Yoshikawa, Hiromi; Sawada, Katsuo; Asanari, Shigeyuki; Kajikawa, Saburo; and Kodama, Takao, 3,888,643.

Matsushita Electric Works, Ltd.: *See—*
Yoshino, Akira; and Imanishi, Hitoshi, 3,889,215.

Matsuura, Shigeo; Saitoh, Takeshi; and Miyamoto, Hiroshi, to Hitachi, Ltd. Local oscillation circuit for reducing oscillation voltage variations between high and low frequency bands. 3,889,210, Cl. 331-109.000.

Matsuzaki, Kazuhiro: *See—*
Ito, Akira; Matsuzaki, Kazuhiro; and Morimoto, Yoshio, 3,888,835.

Mattes, Siegfried: *See—*
Bogus, Klaus; and Mattes, Siegfried, 3,888,697.

Matthews, Larry Richard: *See—*
Perreault, Donald A.; Bedzyk, Victor Lee; Matthews, Larry Richard; Rivers, Roy Wilben; Shuey, David Rolling; and Torpie, John David, 3,889,057.

Mattsson, Ove Henning: *See—*
Stephenson, Ronald Arthur; Laursen, Bente Lissy; and Mattsson, Ove Henning, 3,888,947.

Matueda, Kanji; Niino, Hideki; and Nakano, Yoshitomo, to Permachem Asia Co. Ltd.; and Mitsubishi Petrochemical Co. Ltd. 1,2-Epoxy resin compositions containing aminimide compounds. 3,888,827, Cl. 260-47.0EC.

Mauch, Robert E.: *See—*
Sarbacher, Robert I.; and Mauch, Robert E., 3,889,170.

Maul Bros. Inc.: *See—*
Breeden, Donald H.; and Bowles, John M., 3,888,647.

Maulding, Donald Roy, to American Cyanamid Company. Chlorinated bis(phenylethynyl)anthracenes as fluorescers in chemiluminescent systems. 3,888,786, Cl. 252-188.3CL.

Maurer, Donald D., to Medtronic, Inc. Time shared stimulator. 3,888,261, Cl. 128-420.000.

Mauritz, Frank A. Rear door lock for trucks and trailers. 3,888,529, Cl. 292-259.000.

Max Baermann, Firma: *See—*
Baermann, Max, 3,889,140.

Max-Planck-Gesellschaft ZUR Forderung der Wissenschaften e.V.: *See—*
Tiefenau, Helmut Karl Ernst, 3,888,754.

Maxwell, Richard D., to Tri-M Tool Corporation. Core drill. 3,888,320, Cl. 175-394.000.

May, Edwin A.; Salkin, Burton; and McDonald, Harold Paul, Jr., to International Paper Company. Catheterization kit. 3,888,235, Cl. 128-2.00F.

Mayer, Arthur, to Astrosystems Inc. Two and three-phase oscillators with all-pass network having amplitude responsive time constant. 3,889,206, Cl. 331-45.000.

Mayer, Ehrhard. Dual-cooled slide ring seal. 3,888,495, Cl. 277-3.000.

Mayer, George L., Jr.; and Dobbins, David L., to Coded Signatures, Inc. Video signature decoder and comparator and method. 3,889,056, Cl. 178-6.800.

Maynard, Wade. Bearing puller device. 3,887,989, Cl. 29-427.000.

Mazzeo, Charles F.; and Santos, Anthony J., to Amerace Corporation. Installation tool for wire connectors. 3,887,981, Cl. 29-203.00H.

McBride, David A., to Hercules Incorporated. Method for preparation of fine particle size inorganic oxidizers. 3,888,017, Cl. 34-5.000.

McCain, Colin Christopher: *See—*
Kolombos, Alexander John; McCain, Colin Christopher; and Porter, Eric Andrew, 3,888,889.

McCall, Ernest Bryson: *See—*
Bain, Peter James Stratford; and McCall, Ernest Bryson, 3,888,964.

McChesney, Vernon H. Hand truck and wheel-barrow combination. 3,888,501, Cl. 280-47.180.

McCloskey, Albert R., to Rockwell International Corporation. Self lubricating spherical bearing assembly. 3,888,554, Cl. 308-72.000.

McCloud, James R.: *See—*
Guaglione, Giovanni Paolo; McCloud, James R.; and Aumayer, Hansruedi, 3,889,083.

McConnel, Ronald J.: *See—*
Fraser, Richard S.; Allison, Cecil J., Jr.; Caster, Richard W.; McConnel, Ronald J.; Kribich, Roland E.; and Jone, Paul Y., 3,888,715.

McCormick, Thomas H.: *See—*
Haas, Larry A.; Khalafalla, Sanaa E.; and McCormick, Thomas H., 3,888,970.

McCracken, Kenneth Gordon: *See—*
Holmes, Ralph John; Wylie, Alan Wilson; and McCracken, Kenneth Gordon, 3,889,112.

McCulloch Corporation: *See—*
Jackson, Robert V., 3,889,178.

McCullough, Edward E.; and Anderson, E. Eugene, to Thiokol Corporation. Spike nozzle for rockets. 3,888,419, Cl. 239-265.190.

McCurdy, James P. Firing control system. 3,888,021, Cl. 35-25.000.

McDonald, Bernard: *See—*
Side, Anthony J.; and McDonald, Bernard, 3,888,252.

McDonald, Harold Paul, Jr.: *See—*
May, Edwin A.; Salkin, Burton; and McDonald, Harold Paul, Jr., 3,888,235.

McDonnell Douglas Corporation: *See—*
Dennis, Richard D., 3,888,526.

McEvoy, Francis Joseph: *See—*
Allen, George Rodger, Jr.; and McEvoy, Francis Joseph, 3,888,901.

McFarland, George L., to General Electric Company. High voltage contactor. 3,889,082, Cl. 200-146.00R.

McGann, James E.: *See—*
Smith, James I.; and McGann, James E., 3,888 560.

McGee, James Dwyer, to Electron Physics Limited. Image intensifier tube. 3,889,144, Cl. 313-99.000.

McGuire, Kenneth H. Adjustable fishing pole holder. 3,888,034, Cl. 43-17.000.

McKee, Charles W., to United States of America, General Counsel-Code GP. Fluid control apparatus and method. 3,888,410, Cl. 233-6.000.

McKenzie, George J.; and Ruther, Heinz W., to Westinghouse Canada Limited. Sonar display. 3,889,225, Cl. 340-3.00C.

McKinney, Lee R. Apparatus and method for cleaning air filter elements by vertical reciprocation. 3,888,694, Cl. 134-32.000.

McLander, Lance E.: *See—*
Fries, Bernard J.; and McLander, Lance E., 3,888,613.

McNaughton, Melville, to Campeau Corporation. Machine tool with improved long floating jig fixture table. 3,888,169, Cl. 100-100.000.

McNear, Maxwell F.: *See—*
United States of America, National Aeronautics and Space Administration; Tyagi, Ramesh C.; Debnam, William J., Jr.; McNear, Maxwell F.; Crouch, Roger K.; and Breckenridge, Roger A., 3,888,705.

McNeil Corporation: *See—*
Mars, William T., 3,888,338.

McNulty, Henry V.: *See—*
Oatis, Melvin Neal; and McNulty, Henry V., 3,889,070.

McWilliams, John T. Vehicle utility rack. 3,888,538, Cl. 296-3.000.

Mead Johnson & Company: *See—*
Wu, Yao Hua; and Lobeck, Walter G., Jr., 3,888,852.

Mears, Whitney H., to Allied Chemical Corporation. Method and apparatus for cooling and insulating electrical equipment. 3,889,042, Cl. 174-15.00R.

Measurex Corporation: *See—*
Bossen, David A., 3,889,121.

Medtronic, Inc.: *See—*
Maurer, Donald D., 3,888,261.

Meek, William H., to Ferro Corporation. Antimicrobial compounds of 2', 5' substituted nitroanilides of substituted nitrosalicylic acid for quadruped animals. 3,888,980, Cl. 424-230.000.

Megapulse Incorporated: *See—*
Johannessen, Paul R., 3,889,263.

Meguro, Toshiaki: *See—*
Sasaki, Tadao; Kato, Yasuji; and Meguro, Toshiaki, 3,889,193.

Mehelich, John J.: *See—*
Adickes, Fred; Livesey, James R.; Weir, George; Bailey, Dennis; and Mehelich, John J., 3,888,483.

Mehta, Devendra Vaikunthlal: *See—*
Freake, Ronald; Kuo, Mau H.; and Mehta, Devendra Vaikunthlal, 3,888,741.

Meier, Heinz: *See—*
Eder, Hans; Meier, Heinz; and Richter, Arend, 3,888,479.

Meindl, James D.; and Hottinger, Charles F., to Stanford University. Ultrasonic blood vessel imaging system and method. 3,888,238, Cl. 128-2.00V.

Meininger, Fritz; and Kohlhaas, Folker, to Hoechst Aktiengesellschaft. Water-soluble reactive xanthene dyestuffs and process for preparing them. 3,888,862, Cl. 260-281.000.

Meisterheim, Richard A., to Kawneer Company, Inc. Automatic astragal. 3,888,046, Cl. 49-319.000.

Melichar, Rainer: *See—*
Bigalke, Erhard; Radmann, Dietrich; Klein, Erwin; Melichar, Rainer; and Biedermann, Kurt, 3,888,220.

Mende, David T.: *See—*
Sutter, Robert E.; and Mende, David T., 3,888,486.

Menell, Hans; and Rach Heinz-Dieter, to Continental Gummi-Werke Aktiengesellschaft. Pneumatic vehicle tire. 3,888,292, Cl. 152-362.000.

Menn, Julius J.: *See—*
Pallos, Ferenc M.; and Menn, Julius J., 3,888,888.

Menzel, Willi; and Milde, Gundolf, to Siemens Aktiengesellschaft. Direct-current supply connector. 3,889,129, Cl. 307-105.000.

Merck & Co., Inc.: *See—*
Shen, Tsung-Ying; Greenwald, Richard B.; Jones, Howard; Linn, Bruce O.; and Witzel, Bruce E., 3,888,902.
Veber, Daniel F.; and Brady, Stephen F., 3,888,836.

Merit Plastics, Inc.: *See—*
Bartholomew, Donald D., 3,888,523.

Merriam, Frank R., to Ford Motor Company. Six pole permanent magnet motor. 3,889,141, Cl. 310-154.000.

Merz, Theodore Paul, to Procter & Gamble Company, The. Dispenser for rinse-water additive. 3,888,391, Cl. 222-52.000.

Messineo, Joseph R.: *See—*
Dusoe, George D.; and Messineo, Joseph R., 3,888,175.

Metlesics, Werner; and Sternbach, Leo Henryk, to Hoffmann-La Roche Inc. Process for 2[2-(1,3-diazacycloalk-2-enyl)]benzophenone derivatives and 1,3-diazacycloalkenyl[2,1-a]isoindole derivatives. 3,888,846, Cl. 260-239.0BC.

Meulenberg, Andrew, Jr.: *See—*
Lindmayer, Joseph; Curtin, Denis John; Haynos, Joseph Gabriel; and Meulenberg, Andrew, Jr., 3,888,698.

Meyer, Edwin A., to Xerox Corporation. Apparatus for packaging and subsequently installing a belt onto a roller assembly. 3,888,577, Cl. 355-3.00R.

Meyer, Eric A., to Repco Products Corporation. Air conditioning apparatus. 3,888,090, Cl. 62-240.000.

Meyer, Rudolf; Hoffmann, Klaus; Freytag, Karl-Heinz; and Vetter, Hans, to Agfa-Gevaert Aktiengesellschaft. Aqueous ink for use in the ink jet process. 3,889,269, Cl. 346-1.000.

Meyer, Rudolf: *See—*
Freytag, Karl-Heinz; Meyer, Rudolf; and Hoffman, Klaus, 3,889,271.
Hoffmann, Klaus; Konig, Hans-Dieter; and Meyer, Rudolf, 3,889,270.

Meyer, Willy: *See—*
Dawes, Dag; Meyer, Willy; and Bohner, Beat, 3,888,874.

Middleton, William Joseph, to du Pont de Nemours, E. I., and Company. Bis(dialkylamino)sulfur difluorides. 3,888,924, Cl. 260-543.00F.

Midwestern Instruments, Inc.: *See—*
Anderson, Richard S.; Crafts, Robert L.; Murphy, John A.; Patterson, Irvin L.; and Schultz, Harold P., 3,889,294.

Miekka, Richard G.: *See—*
Carlson, Lee A.; and Miekka, Richard G., 3,888,664.

Mikus, Glenn H. Tie bar for supporting form walls of a concrete form. 3,888,455, Cl. 249-214.000.

Milde, Gundolf: *See—*
Menzel, Willi; and Milde, Gundolf, 3,889,129.

Miles Laboratories, Inc.: *See—*
Freake, Ronald; Kuo, Mau H.; and Mehta, Devendra Vaikunthlal, 3,888,741.

Milewski, Marcel F.; and Weiser, Curtis E., to Ford Motor Company. Canister diode having improved environment protective insulation. 3,889,285, Cl. 357-72.000.

Miley, Robert C. Hypothermia system. 3,888,259, Cl. 128-400.000.

Milford, George Noel, Jr., to du Pont de Nemours, E. I., and Company. Aromatic polyamide fibers containing ultraviolet light screeners. 3,888,821, Cl. 260-45.8NT.

Miller, Clell D.: *See—*
Sharki, Martin James; and Miller, Clell D., 3,888,109.

Miller, David James, to Freeport Minerals Company. Enhanced cobalt recovery from ammoniacally leached reduced ores using cyanide, hydrazine, or hydroxylamine compounds. 3,888,966, Cl. 423-150.000.

Miller, John A.: *See—*
Alferness, Merwin H.; and Miller, John A., 3,889,237.

Miller, Roger L., to Leeds & Northrup Company. Strip chart recorder. 3,889,275, Cl. 346-136.000.

Mills, Roy. Sliding sash closer. 3,887,962, Cl. 16-72.000.

Minall, Anthony William; and Palmer, Edmond Thomas, to J. Evans & Son (Portsmouth) Limited. Filament feeding apparatus. 3,888,401, Cl. 226-109.000.

Minami, Shunji: *See—*
Oka, Shunzo; and Minami, Shunji, 3,889,133.

Mine Safety Appliances Company: *See—*
Temple, Ernest E., 3,888,158.

Minegishi, Toyomasa. Method for purifying waste water. 3,888,751, Cl. 204-152.000.

Minnesota Mining and Manufacturing Company: *See—*
Burguette, Mario D., 3,888,912.
Dahlquist, John C., 3,889,102.
Lewis, Warren F., 3,888,117.
Smith, Carl Mayn; and Van Dyke Tiers, George, 3,888,891.
Stenvall, Carl B., 3,888,247.

Minolta Camera Kabushiki Kaisha: *See—*
Tanaka, Susumu; Enoguchi, Yuji; and Kawabata, Hidetoshi, 3,888,394.

Minorikawa, Kazuo: *See—*
Nomiya, Kosei; Hatsukano, Yoshikazu; and Minorikawa, Kazuo, 3,889,135.

Minster Machine Company, The: *See—*
Fortman, Ronald F.; and Voorhees, John E., 3,888,097.

Miokovic, Stevan, to Regie Nationale des Usines Renault; and Societe dite: Automobiles Peugot. System for the control of the intake and exhaust valves of internal combustion engines. 3,888,216, Cl. 123-90.150.

Miranda, Eduardo V., to Baxter Laboratories, Inc. Reagent Tube and Stopper Assembly. 3,888,113, Cl. 73-64.100.

Miranda, Lawrence Thomas. Eccentric shaft mounting apparatus. 3,888,134, Cl. 74-405.000.

Mitchell, Harry R.: *See—*
Bubniak, William C.; Huellmantel, Louis W.; and Mitchell, Harry R., 3,888,458.

Mitchell, Laymon. Conveyor belt cleaner. 3,888,345, Cl. 198-230.000.

Mitchell, Richard Frank, to U.S. Philips Corporation. Temperature compensated acoustic surface wave oscillator. 3,889,205, Cl. 331-41.000.

Mitchell, Wallace F., to Ammco Tools, Inc. Wheel balancing system. 3,888,128, Cl. 73-484.000.

Mitchell, William A.; Stahl, Howard D.; and Seidel, William C., to General Foods Corporation. Fixed volatile flavors and method for making same. 3,889,008, Cl. 426-534.000.

Mitsubishi Chemical Industries Ltd.: *See—*
Kawamoto, Kensuke; Tsuno, Tomoaki; and Namiki, Teruo, 3,888,969.
Yamaguchi, Kazuo; Kanoh, Natsuki; Ito, Isao; and Enokido, Nobuo, 3,888,834.

Mitsubishi Gas Chemical Co., Inc.: *See—*
Yamana, Hirosuke; Kunii, Tadashi; Furusawa, Tomotaka; Sugimura, Yoshihiro; Nakai, Hiroshi; and Hiro, Yasuo, 3,888,826.

Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
Atsukawa, Masumi; Shinoda, Naoharu; and Kuwubara, Haruo, 3,888,968.
Inoue, Yoshio; and Sato, Yasuaki, 3,888,364.

Mitsubishi Petrochemical Co. Ltd.: *See—*
Matueda, Kanji; Niino, Hideki; and Nakano, Yoshitomo, 3,888,827.

Mitsui Pharmaceuticals, Incorporated: *See—*
Tsumita, Toru; and Kuwabara, Seishi, 3,888,837.

Mitsui Polychemicals, Co., Ltd.: *See—*
Tatsumi, Testujiro; Miyamoto, Reiji; Matsui, Yutaka; Kazama, Seiji; Takemura, Tadao; and Kanayama, Hikoyoshi, 3,889,031.

Mitsui Shipbuilding and Engineering Co., Ltd.: *See—*
Fujii, Masao; Shimatani, Shiro; Orita, Ryoji; and Takemoto, Isao, 3,888,575.
Maeda, Kazuo, 3,888,184.

Mitsui Toatsu Chemicals, Incorporated: *See—*
Ito, Akira; Matsuzaki, Kazuhiro; and Morimoto, Yoshio, 3,888,835.

Miyamoto, Hiroshi: *See—*
Matsuura, Shigeo; Saitoh, Takeshi; and Miyamoto, Hiroshi, 3,889,210.

Miyamoto, Reiji: *See—*
Tatsumi, Testujiro; Miyamoto, Reiji; Matsui, Yutaka; Kazama, Seiji; Takemura, Tadao; and Kanayama, Hikoyoshi, 3,889,031.

Miyano, Masateru, to G. D. Searle & Co. Prostaglandin intermediates and optically active isomers thereof. 3,888,905, Cl. 260-471.00A.

Miyano, Shizuo: *See—*
Maekawa, Yukio; Miyano, Shizuo; Yazawa, Kenichiro; and Kondo, Asaji, 3,888,689.

Miyata, Yoshihiko: *See—*
Koizumi, Kihachiro; Izumida, Yukihiro; and Miyata, Yoshihiko, 3,889,146.

Mizelle, Ned W. Disposable Christmas tree stand. 3,888,438, Cl. 248-48.000.

Mizuno, Kimio; Ando, Takuji; Tsujino, Masatoshi; Takada, Masaki; Yoshizawa, Munetoshi; Matsuda, Tetsuo; and Hayashi, Mitsuo, to Toyo Jozo Kabushiki Kaisha. 4-Carbamoyl-1-β-D-ribofuranosylimidazolium-5-olate. 3,888,843, Cl. 260-211.5OR.

Mlkvy, William P.; and Tucci, Raymond J. Zinc and strontium ion containing effervescent mouthwash tablet. 3,888,976, Cl. 424-44.000.

Mobay Chemical Corporation: *See—*
Cross, James M.; Hudson, George A.; and Hixenbaugh, Joseph C., 3,888,908.

Mobil Oil Corporation: *See—*
Anderson, James J.; and Camacho, Vasco G., 3,888,953.
Downs, John D.; and Massa, Andrew Leo, 3,888,808.
Nnadi, John C.; and Heilweil, Israel Joel, 3,888,773.
Young, Lewis B.; Weinstein, Benjamin; and Jurewicz, Anthony T., 3,888,886.

Mochida, El. Pump for preparing diluted liquids of predetermined degrees of dilution. 3,888,125, Cl. 73-423.00A.

Mohan, William L.; and Willits, Samuel P., to Spartanics, Ltd. Signal stripping circuit. 3,889,136, Cl. 307-295.000.

Molho, Darius: *See—*
Boschetti, Eugene; Molho, Darius; and Fontaine, Louis, 3,888,993.

Moline, Wilbur L., to Kemlite Corporation. Material handling apparatus. 3,888,359, Cl. 214-1.0BB.

Molins Limited: *See—*
Davies, Robert William, 3,888,407.

Moller, Hans Horst: *See—*
Hosterey, Hermann; Moller, Hans Horst; and Raabe, Ernst, 3,889,028.

Molyneux, George, to Molyneux Rail Clips Limited. Rail anchorage provided with a resilient clamping element. 3,888,413, Cl. 238-349.000.

Molyneux Rail Clips Limited: *See—*
Molyneux, George, 3,888,413.

Monaghan, James. Vehicle safety device. 3,888,329, Cl. 180-103.000.

Mondt, James R., to General Motors Corporation. Carburetor enrichment system. 3,888,223, Cl. 123-136.000.

Monsanto Chemicals Limited: *See—*
Bain, Peter James Stratford; and McCall, Ernest Bryson, 3,888,964.
Foster, William R.; Sen, Durgacharan; and Skinner, Stanley J., 3,888,614.

Monsanto Company: *See—*
Alt, Gerhard H., 3,888,915.
Chupp, John Paul, 3,888,903.
Harken, Russell D.; and Morgan, F. Wyman, 3,888,881.
Phillips, Wendell Gary, 3,888,925.

Montgomery, Gary V.: *See—*
Gach, Peter P.; and Montgomery, Gary V., 3,888,373.

Mooch Domsjo Aktiebolag: *See—*
Hultman, Bengt Goran, 3,888,726.

Mooney, David N.: *See—*
Vitticore, Julius M.; and Mooney, David N., 3,888,205.

Moore, Arthur H.: *See—*
Samiran, David; and Moore, Arthur H., 3,888,598.

Moore, Edward J., to Moretrench American Corporation. Apparatus for controlling the level of subsurface water. 3,888,605, Cl. 417-279.000.

Moore, Francis C.; and Perkinson, Leon R., to Moore-Perk Corporation. Abdominal pad or surgical dressing. 3,888,248, Cl. 128-156.000.

Moore-Perk Corporation: *See—*
Moore, Francis C.; and Perkinson, Leon R., 3,888,248.

Moore, Samuel D.: *See—*
Holmes, Jerry D.; and Moore, Samuel D., 3,889,258.

Moreau, Rene V., to Societe Anonyme: Poclain. Public works machines and particularly to buckets therefor. 3,888,371, Cl. 214-767.000.

Moreiras, Luis, to Weatherhead Company, The. Flareless fitting. 3,888,522, Cl. 285-341.000.

Moretrench American Corporation: *See—*
Moore, Edward J., 3,888,605.

Morgan, David Ronald: *See—*
Whittaker, Kenneth; and Morgan, David Ronald, 3,889,022.

Morgan, F. Wyman: *See—*
Harken, Russell D.; and Morgan, F. Wyman, 3,888,881.

Mori, Toshiyuki, to Olympus Optical Co., Ltd. Ph-measuring device used in an endoscope. 3,888,237, Cl. 128-2.00E.

Morimoto, Yoshio: *See—*
Ito, Akira; Matsuzaki, Kazuhiro; and Morimoto, Yoshio, 3,888,835.

Morinaga Milk Industry Co. Ltd.: *See—*
Nagasawa, Taro; Ono, Joji; Kudo, Tutomu; and Harada, Yoshitugu, 3,889,006.

Morinaga, Yasushi: *See—*
Ishizaki, Ayaaki; Morinaga, Yasushi; Sakakibara, Hiroyuki; and Horiuchi, Masao, 3,888,740.

Morozumi, Shinji, to Kabushiki Kaisha Suwa Seikosha. MOS field effect transistor crystal oscillator. 3,889,211, Cl. 331-116.00R.

Morrell, Ronald Joseph; Gumb, Beverley William; and Laing, Graham Stirling, to Northern Electric Company Limited. Interconnector latch assembly for plural banks of multiple pushbutton switches. 3,889,075, Cl. 200-5.00E.

Morris, Michael: *See—*
Allen, William Douglas; and Morris, Michael, 3,889,138.

Morris, Ronald G., to Beaver-Advance Corporation. Scaffold cam lock construction. 3,888,595, Cl. 403-14.000.

Morse, Donald B., to Kemlite Corporation. Preparation of resin impregnated glass fiber sheets. 3,888,716, Cl. 156-276.000.

Mortlock, Walter John. Method of producing furniture. 3,887,988, Cl. 29-416.000.

Moss, James R., to Bendix Corporation, The. Device for positioning stock in a printing mechanism. 3,889,111, Cl. 250-237.00R.

Motoren-und-Turbinen-Union Friedrichshafen GmbH: *See—*
Haide, Karl, 3,888,082.

Motoren-und Turbinen-Union Munchen GmbH: *See—*
Greune, Christian; and Hackl, Friedrich, 3,888,078.

Motorola, Inc.: *See—*
Powell, Michael W., 3,889,287.

Moule, Rex E. Method for making skinless food products. 3,889,013, Cl. 426-513.000.

Moult, Roy H.; and Hood, Richard T., to Koppers Company, Inc. Tire cord dip for polyester fibers. 3,888,813, Cl. 260-29.300.

Muacevic, Gojko: *See—*
Koppe, Herbert; Stahle, Helmut; Kummer, Werner; Muacevic, Gojko; and Traunecker, Werner, 3,888,898.

Mueller, Manfred: *See—*
Arndt, Peter Joseph; Pennewiss, Horst; Plainer, Hermann; Krall, Wilhelm; Masanek, Juergen; and Mueller, Manfred, 3,888,945.

Mueller, Otto, Jr.: *See—*
Elfes, Lee E.; and Mueller, Otto, Jr., 3,888,315.

Mukai, Seio: *See—*
Komatsu, Hajime; and Mukai, Seio, 3,888,679.

Muller, Erich: *See—*
Narr, Berthold; Roch, Josef; Muller, Erich; and Nickl, Josef, 3,888,851.

Mullis, Clyde M.: *See—*
Tosato, Lawrence; Abel, Leon A.; and Mullis, Clyde M., 3,889,231.

Multi-Point Tool Co., Inc.: *See—*
Mackelvie, Philip A., 3,888,140.

Munnerly, Charles R.; Obinson, Bruce R.; and Horwitz, James W., to Tropel, Inc. Apparatus and method of measuring the refractive error of an eye. 3,888,569, Cl. 351-6.000.

Muraco, Paul F.; and Griffin, James S., to United States of America, Navy. Radar recording and reproducing system with pulse modulation and time division multiplexing. 3,889,293, Cl. 360-18.000.

Muramatu, Tadao: *See—*
Kizu, Ryohei; Muramatu, Tadao; and Kobayasi, Teruo, 3,888,508.

Murase, Yasuhiro: *See—*
Koizumi, Yukimichi; Kobayashi, Yoshihiro; Murase, Yasuhiro; and Kondo, Takamitsu, 3,888,775.

Murphy, John A.: *See—*
Anderson, Richard S.; Crafts, Robert L.; Murphy, John A.; Patterson, Irvin L.; and Schultz, Harold P., 3,889,294.

Murphy, Joseph A., to National-Southwire Aluminum Co. Method of and apparatus for producing metal. 3,888,747, Cl. 204-67.000.

Muzyczko, Thaddeus M.; and Jones, Thomas H., to Richardson Company, The. Photoreactive compositions and products made therewith. 3,888,671, Cl. 96-33.000.

Myers, John L., to Ledex, Inc. Solenoid driving means. 3,889,162, Cl. 317-148.50R.

Myers, John L.: *See—*
Flachbarth, Charles T.; and Myers, John L., 3,889,044.

Nadelson, Jeffrey: *See—*
Houlihan, William J.; and Nadelson, Jeffrey, 3,888,900.

Nagao, Kameji: *See—*
Horie, Ikutaro; and Nagao, Kameji, 3,888,681.

Nagasao, Toshiie: *See—*
Teshima, Toru; Nagasao, Toshiie; Tanaka, Minoru; Ariga, Kazuo; and Inoue, Kiyoshi, 3,888,756.

Nagasawa, Taro; Ono, Joji; Kudo, Tutomu; and Harada, Yoshitugu, to Morinaga Milk Industry Co. Ltd. An animal feed of high digestibility. 3,889,006, Cl. 426-656.000.

Nagase, Minoru, to Nippon Air Brake Company, The. Compressor governor. 3,888,603, Cl. 417-25.000.

Nagel, Robert H.; and Saylor, Richard, to IDR, Inc. Row grabbing system. 3,889,054, Cl. 178-6.800.

Naimy, Norma: *See—*
Amundsen, Joseph; Wetzel, William H.; Naimy, Norma; and Goodwin, Robert J., 3,889,020.

Nakagawa, Yoshinobu: *See—*
Fujiwhara, Mitsuto; Kasai, Keiji; Satoh, Ryosuke; Nakagawa, Yoshinobu; and Tanigawa, Tuneo, 3,888,680.

Nakai, Hiroshi: *See—*
Yamana, Hirosuke; Kunii, Tadashi; Furusawa, Tomotaka; Sugimura, Yoshihiro; Nakai, Hiroshi; and Hiro, Yasuo, 3,888,826.

Nakamura, Yoshio: *See—*
Watanabe, Kiyoshi; Hirakawa, Tamotsu; Takahara, Kenji; Nakamura, Yoshio; Iwasaki, Sueo; and Tanaka, Tutomu, 3,888,737.

Nakano, Fumio: *See—*
Toriyama, Kazuhisa; Nakano, Fumio; Sato, Mikio; Abe, Hidetoshi; and Kanazaki, Mikio, 3,888,566.

Nakano, Yoshitomo: *See—*
Matueda, Kanji; Niino, Hideki; and Nakano, Yoshitomo, 3,888,827.

Nakashio, Seizo; Sekine, Noriyuki; Toyota, Nobuhiro; and Fujita, Fumio, to Sumitomo Chemical Co., Ltd.; and Hayashibara Biochemical Laboratories, Inc. Paint containing pullulan. 3,888,809, Cl. 260-17.4ST.

Namiki, Teruo: *See—*
Kawamoto, Kensuke; Tsuno, Tomoaki; and Namiki, Teruo, 3,888,969.

Narang, Saran A.; Dheer, Surinder K.; and Wightman, Robert H., to Canadian Patents and Development Limited. Arylmercaptoethyl phosphates 3,888,950, Cl. 260-933.000.

Narr, Berthold; Roch, Josef; Muller, Erich; and Nickl, Josef, to Boehringer Ingelheim GmbH. 2,4-Diamino-substituted thieno(3,2-d)pyrimidines and salts thereof. 3,888,851, Cl. 260-243.00R.

Naruchi, Tatsuyuki: *See—*
Fujita, Yutaka; Naruchi, Tatsuyuki; and Yoshisato, Eishin, 3,888,845.

National Advertising Company: *See—*
Schubert, Wilfried, 3,888,029.

National-Southwire Aluminum Co.: *See—*
Murphy, Joseph A., 3,888,747.

National Starch and Chemical Corporation: *See*—
Georgoudis, Paul C., 3,888,817.
Sirota, Jilius; Forsyth, Robert S.; and Fergesen, David, 3,888,811.

Naubereit, Hans: *See*—
Pinten, Peter; Naubereit, Hans; and Trautvetter, Werner, 3,888,948.

Needham, James C., to Welding Institute, The. Resistance welding. 3,889,094, Cl. 219-89.000.

Neill, William M.: *See*—
Burt, George A., Jr.; and Neill, William M., 3,888,395.

Neiman, Herbert M.: *See*—
Katz, Martin; and Neiman, Herbert M., 3,888,995.

Nelson, Arnold S., to GAF Corporation. Algicidal post treated roofing granules. 3,888,682, Cl. 106-15.0AF.

Nelson, Verner R.: *See*—
Failli, Amedeo; Nelson, Verner R.; Immer, Hans U.; and Gotz, Manfred K., 3,888,840.
Immer, Hans U.; Nelson, Verner R.; and Gotz, Manfred K., 3,888,838.

Netting, David I., to Philadelphia Quartz Company. Method of making hollow spheres by spray drying. 3,888,957, Cl. 264-13.000.

Neumeier, Leander A.: *See*—
Tilman, Milton M.; Crosby, Robert L.; and Neumeier, Leander A., 3,888,703.

Neumunstersche Maschinen-und Apparatebau Ges. mbH: *See*—
Bauch, Ernst, 3,887,972.

Neuner, James A., to Westinghouse Electric Corporation. Communication between redundant protection and safeguards logic systems within nuclear reactor power plants by means of light. 3,888,772, Cl. 250-199.000.

Neves, Antonio Maria Castello Brancoe. Apparatus for controlling the actuation of the brakes of a motor vehicle. 3,888,551, Cl. 303-84.00A.

New England Merchant Natl. Bank, executor: *See*—
Worthen, Eugene P., deceased; and New England Merchant Natl. Bank, executor, 3,888,337.

Newell, Jon Albert; Seeley, Robert Dudley; and Robbins, Ernest Aleck, to Anheuser-Busch, Incorporated. Isolated yeast protein product with intact ma and a process for making same. 3,888,839, Cl. 260-112.00R.

NGK Insulators Ltd.: *See*—
Mase, Shunzo; and Watanabe, Tetsuo, 3,889,041.

Nguyen Van, Trong, to La Telemecanique Electrique. Linear and rotary actuator. 3,889,165, Cl. 318-115.000.

Nichols, Arnold Douglas; and Sundt, Cornelius Vickers, to United Aircraft Corporation. Stress restraining ring for compressor rotors. 3,888,602, Cl. 416-198.000.

Nichols, Douglas Alan: *See*—
Clarke, William; Dawson, Timothy Leslie; and Nichols, Douglas Alan, 3,888,623.

Nickl, Josef: *See*—
Narr, Berthold; Roch, Josef; Muller, Erich; and Nickl, Josef, 3,888,851.

Nicoll, Frank S., Jr. Modular constructed fiberglass reinforced paperboard boat. 3,887,952, Cl. 9-6.000.

Niedermayr, Alois: *See*—
Fastner, Thorwald; Niedermayr, Alois; and Bachner, Ernst, 3,888,294.

Niessner, Robert A. Self-contained kitchen unit for a van type vehicle. 3,888,539, Cl. 296-23.00D.

Nigido, Salvatore A. Swedger apparatus. 3,888,102, Cl. 72-393.000.

Nigol, Olaf. Semiconductive glaze compositions. 3,888,796, Cl. 252-518.000.

Niino, Hideki: *See*—
Matueda, Kanji; Niino, Hideki; and Nakano, Yoshitomo, 3,888,827.

Nikitin, Jury Stepanovich: *See*—
Kiselev, Andrei Vladimirovich; Kustova, Galina Lvovna; Lipkind, Boris Alexandrovich; and Nikitin, Jury Stepanovich, 3,888,972.

Nims, Jerry R., to Soiltest, Inc. Method and apparatus for determining road roughness. 3,888,118, Cl. 73-105.000.

Ninomiya, Hisakazu: *See*—
Tanaka, Tsuyoshi; and Ninomiya, Hisakazu, 3,889,167.

Nippes, J. Timothy. Trash disposal apparatus. 3,888,406, Cl. 229-14.00R.

Nippon Air Brake Company, The: *See*—
Nagase, Minoru, 3,888,603.

Nippon Electric Company, Limited: *See*—
Okada, Takashi; Yamagishi, Sokichi; Kamoshida, Mototaka; Satake, Tomomitsu; and Kishi, Sadayuki, 3,887,993.

Nippon Gakki Seiko Kabushiki Kaisha: *See*—
Deutsch, Ralph, 3,888,153.
Yamaguchi, Kiminori, 3,888,333.

Nippon Oil Co., Ltd.: *See*—
Iizuka, Hiroshi; Seto, Naosuke; and Sakayanagi, Sadao, 3,888,736.
Shinomura, Toshihiko, 3,888,810.

Nippon Telegraph and Telephone Public Corporation: *See*—
Ogiwara, Haruo, 3,889,233.

Nippondenso Co., Ltd.: *See*—
Ishihara, Shinya; and Suzuki, Yoshihiro, 3,889,126.

Nishizawa, Edward E.: *See*—
Lednicer, Daniel; and Nishizawa, Edward E., 3,888,833.

Nishizawa, Junichi; and Ichinose, Wasaburo, to Handotai Kenkyu Shinkokai; and Kokusai Denki Kabushiki Kaisha. Position control system using magnetic forces for correcting the inclination of a controlled member including a torsional mounting. 3,889,164, Cl. 318-640.000.

Nissan Motor Company Limited: *See*—
Chikaraishi, Takayo, 3,888,047.
Fukasawa, Noburu; Kitagawa, Takanori; and Inoue, Naohiko, 3,887,958.
Fukumori, Yukitsugu, 3,889,259.
Hayashi, Tadashi, 3,889,077.

Nisshin Tsushima Co., Ltd.: *See*—
Tsushima, Yakichi, 3,888,447.

Nittan Limited Company: *See*—
Ito, Shoji, 3,888,641.

Nnadi, John C.; and Heilweil, Israel Joel, to Mobil Oil Corporation. Nitrogen compounds linked to a heterocyclic ring as multifunctional additives in fuel and lubricant compositions. 3,888,773, Cl. 252-37.200.

Noble, Peter M., to Westinghouse Air Brake Company. Control system for suppressing wheel squealing noise produced by railroad car retarders. 3,888,183, Cl. 104-26.00A.

Nohira, Hidetaka, to Toyota Jidosha Kogyo Kabushiki Kaisha. Air flow control valve. 3,888,080, Cl. 60-290.000.

Nomiya, Kosei; Hatsukano, Yoshikazu; and Minorikawa, Kazuo, to Hitachi, Ltd. Bootstrap circuit employing insulated gate transistors. 3,889,135, Cl. 307-270.000.

Non-Impact Surfaces Limited: *See*—
Gowler, John Edward, 3,888,542.

Nooker, Eugene L., to United States of America, Navy. Rod warhead. 3,888,180, Cl. 102-67.000.

Noordegraaf, Frederik: *See*—
Roukema, Johannes; and Noordegraaf, Frederik, 3,888,757.

Nord, Kermit; and Wallenhorst, Francis C., to United States of America, Army. Initiator for incendiary pellet. 3,888,179, Cl. 102-66.000.

Norris, Philip R.; and Rubinstein, Leon, to Polaroid Corporation. Multi-element lens assembly. 3,888,568, Cl. 350-252.000.

Northern Electric Company Limited: *See*—
Morrell, Ronald Joseph; Gumb, Beverley William; and Laing, Graham Stirling, 3,889,075.
Pighin, Albert; and Malanka, Douglas Peter, 3,888,784.
Thompson, James Lawrence Earl; Clarke, Wallace Eugene; and Gale, James, 3,889,059.
Zimmermann, Detlef; Lougheed, James Hugh; and Crompton, Eric John, 3,889,262.

Norton Villiers Limited: *See*—
Roe, Geoffrey Ernest; and Favill, John Edward, 3,888,332.

Novak, James B., to Continental Can Company, Inc. Easy opening end unit. 3,888,384, Cl. 220-268.000.

Novak, Raymond F.: *See*—
Ramspeck, Howard B.; and Novak, Raymond F., 3,888,404.

Nowak, Gerald; and Decker, Herbert, to Triumph Werke Nurnberg A. G. Impression control mechanism for a typewriter or similar machine. 3,888,339, Cl. 197-55.000.

Nowak, Richard T.: *See*—
Knott, Sydney T.; Hess, Frederick R.; and Nowak, Richard T., 3,889,230.

Nupla Corporation: *See*—
Carmien, Joseph Allen; Davis, Elbert; and Cervi, Roger G., 3,888,721.

Nuss, James J., to General Electric Company. Door cooling system. 3,889,099, Cl. 219-393.000.

Nygaard, James L., to Texas Instruments Incorporated. Automatic slice processing. 3,888,674, Cl. 96-36.000.

Oatis, Melvin Neal; and McNulty, Henry V., to Telephonic Equipment Company. Tone detecting telephone connection monitor. 3,889,070, Cl. 179-18.00F.

Obenchain, Irving R., Jr.: *See*—
Reed, Irving S.; and Obenchain, Irving R., Jr., 3,889,067.

Oberdiear, Robert C., to Amex Systems, Inc. Strain relief and grounding device for shielded electrical cables. 3,889,046, Cl. 174-78.000.

Obinson, Bruce R.: *See*—
Munnerly, Charles R.; Obinson, Bruce R.; and Horwitz, James W., 3,888,569.

O'Brien, Dennis H.; and Havranek, Dennis D., to Valmont Industries Inc. Pole mounting bracket attachment. 3,888,446, Cl. 248-231.000.

O'Brien, Robert A.; and Peterson, Manuel. Self-leveling hoist for wheel chairs. 3,888,463, Cl. 254-10.00C.

Ocean Food Inc.: *See*—
Gunter, Gordon; and Venkataramaiah, Amaraneni, 3,889,007.

Oetiker, Hans, to Gebruder Buhler AG. Flow controller for flowing products, more particularly, bulk materials. 3,888,389, Cl. 222-23.000.

Offermanns, Heribert: *See*—
Asinger, Friedrich; Gluzek, Karl-Heinz; and Offermanns, Heribert, 3,888,923.

Ogasawara, Makoto; Suzuki, Kazuyoshi; Urasaki, Takanori; Shima, Takeo; Kurisu, Shizuka; and Hirabayashi, Yasuji, to Teijin Limited. Process for obtaining 2,6-dimethylnaphthalene-rich or 2,7-dimethylnaphthalene-rich product. 3,888,938, Cl. 260-668.00A.

Ogasawara, Takahisa; Senzaki, Yoshimichi; Kato, Hiroyuki; and Tatemichi, Hidemaro, to Toagosei Chemical Industrial Co., Ltd. Curable compositions. 3,888,830, Cl. 260-76.000.

Ogata, Fumio: *See*—
Isogai, Tokio; Isikawa, Eiichi; Fukushi, Keiji; Amano, Hisao; Ogata, Fumio; and Ikemoto, Norio, 3,889,175.

Ogawa, Masahiro: *See*—
Koyama, Masao; Okada, Noboru; and Ogawa, Masahiro, 3,888,717.

Ogiso, Mitsutoshi; and Taguchi, Tetsuya, to Canon Kabushiki Kaisha. Device for controlling exposure factors in cameras. 3,889,277, Cl. 354-36.000.

Ogiwara, Haruo, to Nippon Telegraph and Telephone Public Corporation. Character coincidence detector for optical information retrieval systems. 3,889,233, Cl. 340-146.30F.

Oiles Kogyo Kabushiki Kaisha: *See*—
Ebata, Akira; and Kodate, Teiji, 3,888,660.

Oivind Lorentzen Activities, Inc.: *See*—
Bergsland, Jon, 3,888,087.

Oka, Shunzo; and Minami, Shunji, to Matsushita Electric Industrial Co., Ltd. Output-voltage variable device. 3,889,133, Cl. 307-239.000.

Okada, Noboru: *See*—
Koyama, Masao; Okada, Noboru; and Ogawa, Masahiro, 3,888,717.

Okada, Shigetaka; and Kitahata, Sumio, to Hayashibara Kabushiki-Kaisha. Method for purifying cyclodextrin-producing enzymes. 3,888,738, Cl. 195-66.00R.

Okada, Takashi; Yamagishi, Sokichi; Kamoshida, Mototaka; Satake, Tomomitsu; and Kishi, Sadayuki, to Nippon Electric Company, Limited. Method of making an ohmic contact with a semiconductor substrate. 3,887,993, Cl. 29-571.000.

Oki Electric Industry Co., Ltd.: *See*—
Kobayashi, Goro, 3,889,254.

Okuhara, Akira; Saiki, Masatoshi; and Saito, Nobuo, to Robert Bosch G.m.b.H. Liquid food preservation. 3,888,224, Cl. 426-126.000.

Olin Corporation: *See*—
Wojtowicz, John A., 3,888,856.

Olof Lindstedt & Co. AB: *See*—
Lindstedt, Per Olof, 3,888,704.

Olsen, Lee J.: *See*—
Jentzsch, David P.; Anderson, Hyrum T.; and Olsen, Lee J., 3,888,186.

Olsen, Willi; Lorenz, Dieter; and Beer, Heinz, to Siemens Aktiengesellschaft. Combination of a pressurized-gas insulated high-voltage switching installation and a multi-pole grounding switch device. 3,889,076, Cl. 200-48.00R.

Olympus Optical Co., Ltd.: *See*—
Mori, Toshiyuki, 3,888,237.

Onishi, Kazutoshi; Awano, Tsuneo; and Masuzawa, Isao, to Kabushikikaisha Tokyo Keiki. On-off control circuit. 3,889,168, Cl. 318-341.000.

Ono, Joji: *See*—
Nagasawa, Taro; Ono, Joji; Kudo, Tutomu; and Harada, Yoshitugu, 3,889,006.

Ono, Yotsuo: *See*—
Isuge, Masami; Uematsu, Shinichi; Ono, Yotsuo; Eiga, Shokichi; and Makita, Minoru, 3,888,771.

Optical Systems Corporation: *See*—
Dejoux, Jean Veran, 3,888,572.

Ore-Lube Corporation, The: *See*—
Silverstein, Joseph J., 3,888,776.

Orita, Ryoji: *See*—
Fujii, Masao; Shimatani, Shiro; Orita, Ryoji; and Takemoto, Isao, 3,888,575.

Orshansky, Elias, Jr., to Orshansky Transmission Corporation. Hydromechanical transmission. 3,888,139, Cl. 74-687.000.

Orshansky Transmission Corporation: *See*—
Orshansky, Elias, Jr., 3,888,139.

Orso, Francis L.; and Piazza, Giacomo J., to Corning Glass Works. In-line homogenizing of extrudable ceramic batch materials. 3,888,963, Cl. 264-176.00R.

Osborne, Gordon W. Automatic or manual multi-speed transmission for electrically propelled vehicles. 3,888,326, Cl. 180-65.00R.

Oshima, Ryoichiro; Suginuma, Atsushi; Kishi, Atsuo; and Kawashima, Kenichi, to Hitachi, Ltd. Compressor for a refrigerating machine. 3,888,604, Cl. 417-269.000.

Oshima, Shigenobu: *See*—
Kishigami, Kunio; Kobayashi, Hiroshi; and Oshima, Shigenobu, 3,888,193.

O'Sickey, Lawrence B., to Parker-Hannifin Corporation. Tube coupling and ferrule therefor. 3,888,521, Cl. 285-341.000.

Osmond, John S. Ventilated seating for a water closet. 3,887,949, Cl. 4-217.000.

Ostertog, Robert J.; and Page, Anthony J., to Johns-Manville Corporation. Insulating product and dry process for its manufacture. 3,888,962, Cl. 264-122.000.

Owens-Corning Fiberglas Corporation: *See*—
Marzocchi, Alfred, 3,888,645.

Owens-Illinois, Inc.: *See*—
Ellis, James L., 3,888,686.

Ozark-Mahoning Company: *See*—
Coghill, William W.; and Rotramel, William J., 3,888,635.

Page, Anthony J.: *See*—
Ostertog, Robert J.; and Page, Anthony J., 3,888,962.

Pallos, Ferenc M.; and Menn, Julius J., to Stauffer Chemical Company. Insecticidal active geranyl and citronyl amine derivatives and their epoxides. 3,888,888, Cl. 260-348.00A.

Pallos, Ferenc M.; and Tseng, Chien K., to Stauffer Chemical Company. Derivatives of certain geranyl phenyl ethers and their use in controlling insects. 3,888,987, Cl. 424-278.000.

Palmer, Charles. Communications transceiver adapted for mounting on a helmet. 3,889,190, Cl. 325-16.000.

Palmer, Edmond Thomas: *See*—
Minall, Anthony William; and Palmer, Edmond Thomas, 3,888,401.

Pande, Gyan S.; and Balatoni, Julius A., to Uniroyal Inc. Method of making 5,6-dihydro-2-methyl-1,4-oxathiin-3-carboxamide 4,4-dioxides. 3,888,878, Cl. 260-327.00P.

Panella, Edward A., to United States of America, Navy. Method of assembling a safety device for rockets. 3,887,991, Cl. 29-450.000.

Panetti, Romolo, to Speno International S.A.; and Frank Speno Railroad Ballast Cleaning Co., Inc. Relating to methods for grinding rails. 3,888,052, Cl. 51-281.00R.

Panitz, Eric; and Daniels, Peter J. L., to Schering Corporation. Certain 1-(5-nitro-2-thienyl)-1-acylamidoalkanes for treating histomoniasis. 3,888,986, Cl. 424-275.000.

Pardes, Herman I.; Schwartz, Joseph R.; and Sherburne, Frederick B., to United States of America, Army. Moving target screen. 3,888,022, Cl. 35-25.000.

Park, William P.: *See*—
Hollenton, Frank; and Park, William P., 3,888,262.

Parke, Davis & Company: *See*—
Cook, Roy G.; and Jackson, James P., 3,888,257.

Parker, Dorothy C., executrix: *See*—
Parker, Joseph D., deceased; Parker, Dorothy C., executrix; Hergert, Richard E.; and Roerig, Arnold J., 3,888,729.

Parker-Hannifin Corporation: *See*—
O'Sickey, Lawrence B., 3,888,521.
Vitticore, Julius M.; and Mooney, David N., 3,888,205.

Parker, Joseph D., deceased; by Parker, Dorothy C., executrix; Hergert, Richard E.; and Roerig, Arnold J. Papermaking machine headbox slice chamber containing pivotable thin rigid plates with flexible elements attached thereto. 3,888,729, Cl. 162-343.000.

Parmann, Gunnar, to Rieber & Son Plastic-Industri A/S. Process of producing a socket joint between a pair of lengths of thermo-plastic pipe. 3,887,992, Cl. 29-450.000.

Parr, Edward L.: *See*—
Straza, George T.; and Parr, Edward L., 3,888,531.

Parrilla, Salvatore C. Safety device to prevent tipping a bicycle. 3,888,511, Cl. 280-239.000.

Pars, Harry G.; and Razdan, Raj K., to Arthur D. Little, Inc. Pyrano benzopyrans. 3,888,946, Cl. 260-326.50B.

Parsons, Joseph D. Screw and driver. 3,888,144, Cl. 81-71.000.

Parups, Eriks: *See*—
Hanson, Walter J.; and Parups, Eriks, 3,888,399.

Pasternak, Joseph: *See*—
Vittoria, Carmine; Pasternak, Joseph; and Lessoff, Howard, 3,889,213.

Patterson, Irvin L.: *See*—
Anderson, Richard S.; Crafts, Robert L.; Murphy, John A.; Patterson, Irvin L.; and Schultz, Harold P., 3,889,294.

Patton, Jon Richard; and Sisson, Ronald Loren, to Clark Equipment Company. Hydrastatic control for pivot steering. 3,888,323, Cl. 180-6.300.

Payne, Earl E. Ladder rack. 3,888,398, Cl. 224-42.100.

PCR, Inc.: *See*—
Schuman, Paul D.; and Stump, Eugene C., Jr., 3,888,854.

Peabody, Glenn Robert: *See*—
Velan, George Michael; and Peabody, Glenn Robert, 3,888,129.

Pecherer, Benjamin: *See*—
Brossi, Arnold; and Pecherer, Benjamin, 3,888,907.

Pence, Ralph T., to Hallet, Jack M. Bracket. 3,888,445, Cl. 248-225.000.

Pennewiss, Horst: *See*—
Arndt, Peter Joseph; Pennewiss, Horst; Plainer, Hermann; Krall, Wilhelm; Masanek, Juergen; and Mueller, Manfred, 3,888,945.

Pereira, John A.: *See*—
Jones, Gary V.; Pereira, John A.; and Rehman, Warren C., 3,888,999.

Perkinson, Leon R.: *See*—
Moore, Francis C.; and Perkinson, Leon R., 3,888,248.

Perl, Theodore. Light-proofed radiographic cassette unloader and reloader. 3,888,587, Cl. 355-112.000.

Permachem Asia Co. Ltd.: *See*—
Matueda, Kanji; Niino, Hideki; and Nakano, Yoshitomo, 3,888,827.

Perreault, Donald A.; Bedzyk, Victor Lee; Matthews, Larry Richard; Rivers, Roy Wilben; Shuey, David Rolling; and Torpie, John David, to Xerox Corporation. Fascimile communication system. 3,889,057, Cl. 178-69.50F.

Personal Products Company: *See*—
Shah, Praful H.; and Srinivasan, Subramania, 3,888,255.

Peters, Carl I., to United States of America, Navy. Method of antenna tuning. 3,889,268, Cl. 343-703.000.

Peterson, Adrian J.: *See*—
Holland, Robert F.; and Peterson, Adrian J., 3,888,644.

Peterson, Charles A., to Westinghouse Electric Corporation. Series capacitor protection equipment with dual sparkover feature. 3,889,158, Cl. 317-12.00A.

Peterson, Donald J., to Procter & Gamble Company, The. Protective coatings. 3,889,025, Cl. 428-413.000.

Peterson, Manuel: *See*—
O'Brien, Robert A.; and Peterson, Manuel, 3,888,463.

Peterson, Walter O. Power transmission with adjustable fulcrum. 3,888,512, Cl. 280-255.000.

Petitjean, Christian H.; Marchand, Maurice E. L.; and Denis, Marcel, to International Standard Electric Corporation. Pass-band filter having electronically adjustable midfrequency. 3,889,214, Cl. 333-73.00R.

Petrik, Bruno; and Ruf, Erich, to TH Goldschmidt AG. Process for manufacturing carrier sheets treated with hardenable aminoplast resin preliminary condensates for surface coating. 3,888,728, Cl. 162-167.000.

Petrolite Corporation: *See—*
Redmore, Derek, 3,888,626.
Redmore, Derek, 3,888,627.

Pettersen, Aage, to Corning Glass Works. Digital calibration system for an electronic instrument. 3,889,255, Cl. 340-347.0CC.

Pettit, Marshall G. Motion-responsive shutoff valve. 3,888,271, Cl. 137-45.000.

Pews, R. Garth; Goralski, Christian T.; and Burk, George A., to Dow Chemical Company, The. Bis (thiocyanomethylthio) thiadiazoles. 3,888,869, Cl. 260-302.0SD.

Pfaff Industriemaschinen GmbH: *See—*
Bauer, Wilhelm; and Stahlschmitt, Horst, 3,888,198.

Pfizer Inc.: *See—*
Kadin, Saul B., 3,888,988.

Philadelphia Quartz Company: *See—*
Netting, David I., 3,888,957.

Philip, Morris. Stop motion assembly and method. 3,888,095, Cl. 66-163.000.

Phillips, Buster C. Progressive molding method. 3,888,959, Cl. 264-32.000.

Phillips Petroleum Company: *See—*
Erickson, Wayne K.; and Stegelman, Albert F., 3,887,969.
Kubicek, Donald H., 3,888,940.

Phillips, Wendell Gary, to Monsanto Company. Substituted dichlorosulfenamides. 3,888,925, Cl. 260-551.00S.

Phonplex Corporation: *See—*
Slavin, Martin J., 3,889,063.

Piazza, Giacomo J.: *See—*
Orso, Francis L.; and Piazza, Giacomo J., 3,888,963.

Pickett, John E. P.: *See—*
Kinney, Thomas D.; and Pickett, John E. P., 3,889,014.

Piegza, Henry J., to WSF Industries Inc. Construction for mounting a door of a pit mounted pressure vessel. 3,888,045, Cl. 49-255.000.

Pierce, Edwin F.; Roberts, Larry W.; and Maddox, Leland D., to Amer-O-Matic Corporation. Envelope opening machine. 3,888,069, Cl. 53-381.00R.

Pierce, John T., to Iota Engineering Inc. Power source for fluorescent lamps and the like. 3,889,153, Cl. 315-209.00R.

Pighin, Albert; and Malanka, Douglas Peter, to Northern Electric Company Limited. Electrochemical luminescent composition. 3,888,784, Cl. 252-188.3CL.

Pike, John E.; and Schneider, William P., to Upjohn Company, The. 11,15 Dimethyl PGE_1 and PGF_1 . 3,888,919, Cl. 260-514.00D.

Pilkington P-E Limited: *See—*
Swift, David William, 3,888,589.

Pillus, Charles A.: *See—*
Ku, San-Mei; and Pillus, Charles A., 3,887,994.

Pilz, Gilbert B.; and Vivian, James R., to Young Daybrook, Inc. Tractor-trailer service line coupling. 3,888,513, Cl. 280-421.000.

Pinten, Peter; Naubereit, Hans; and Trautvetter, Werner, to Dynamit Nobel AG. Polyvinyl chloride type resins. 3,888,948, Cl. 260-878.00R.

Pioneer Electronic Corporation: *See—*
Itagaki, Tadasi, 3,889,074.

Pioneer Welding Company Limited: *See—*
Yates, Michael Joseph; and Hurst, Kenneth James, 3,887,951.

Pitney-Bowes, Inc.: *See—*
Hanson, Walter J.; and Parups, Eriks, 3,888,399.

Pittsburgh Brass Manufacturing Company: *See—*
Brennan, James H., 3,888,520.

Plainer, Hermann: *See—*
Arndt, Peter Joseph; Pennewiss, Horst, Plainer, Hermann; Krall, Wilhelm; Masanek, Juergen; and Mueller, Manfred, 3,888,945.

Plettner, Wolfram, to Hoechst Aktiengesellschaft. Process for the manufacture of aqueous expoxide resin emulsions. 3,888,812, Cl. 260-24.000.

Pletzke, Thomas S.: *See—*
Espino, Ramon L.; and Pletzke, Thomas S., 3,888,896.

Plueddemann, Edwin P., to Dow Corning Corporation. Silicone elastomers bonded to solid substrates. 3,889,023, Cl. 428-429.000.

Polaroid Corporation: *See—*
Bader, Henry; and Rickter, Donald O., 3,888,875.
Bader, Henry; and Boag, Alexander, 3,888,876.
Biber, Conrad H., 3,889,280.
Cardone, Paul A., 3,888,669.
Erlichman, Irving, 3,887,984.
Gerber, Arthur M., 3,889,125.
Norris, Philip R.; and Rubinstein, Leon, 3,888,568.
Stella, Joseph A., 3,888,570.

Polgar, Istvan: *See—*
Szantay, Csaba; Szabo, Lajos; Kreidl, Janos; Kalaus, Gyorgy; Keve, Tibor; Turczanyi, Peter; Polgar, Istvan; Farkas nee Kirjak, Maria; and Lakszner, Katalin, 3,888,865.

Ponzoni, George B.; and Leonard, Richard J., to General Foods Corporation. Method for a freeze dried fortified coffee having improved rate of solubility. 3,888,859, Cl. 426-262.000.

Porter, Eric Andrew: *See—*
Kolombos, Alexander John; McCain, Colin Christopher; and Porter, Eric Andrew, 3,888,889.

Potin, Philippe: *See—*
Biensan, Michael; and Potin, Philippe, 3,888,832.

Powell, Michael W., to Motorola, Inc. Mnos memory matrix. 3,889,287, Cl. 357-23.000.

Powlan, Roy Y. Adjustable traction device. 3,888,243, Cl. 128-75.000.

PPG Industries, Inc.: *See—*
Doerge, Herman P.; Slater, Charles G.; and Seiner, Jerome A., 3,888,803.
Drummond, Warren W., 3,887,970.
Franz, Helmut; and Lecoco, David E., 3,889,017.
Simhan, Krishna, 3,888,649.

Prahst, Eugene D., to Heil Co., The. Self-unloading vehicle. 3,888,366, Cl. 214-83.220.

Praye, Clyde A.: *See—*
Harris, Stephen W.; and Praye, Clyde A., 3,888,242.

Preston, Jerome A., to Essex International Inc. Theic-hydantoin-ester resins for wire coatings. 3,889,036, Cl. 428-383.000.

Procter & Gamble Company, The: *See—*
Kingry, Gary W.; and Lahrman, Frank H., 3,888,781.
Merz, Theodore Paul, 3,888,391.
Peterson, Donald J., 3,889,025.
Sampson, Ronald Lee; and Whyte, David Denzil, 3,888,998.
Van Coney, Robert H., 3,888,392.

Production Technology Inc.: *See—*
Jones, Thaddeus M.; Kiwalle, Jozef; and Ruder, Ernest J., 3,888,405.

Protze, Dieter; and Bauer, Andreas, to Volkswagenwerk Aktiengesellschaft. Safety device. 3,888,540, Cl. 297-384.000.

Province, William F., to Ridge Tool Company, The. Pipe pulling tool. 3,887,983, Cl. 29-234.000.

Przybylek, George John, to Burroughs Corporation. Gaseous discharge display panel with scanning anode base plate assembly including resistive masses. 3,889,150, Cl. 315-58.000.

Pulsepower Systems, Inc.: *See—*
Elmore, Lester C.; and Broxholm, Thomas M., 3,888,159.

Purtell, Rufus J., to Tri-Matic, Inc. One wheel pull-type irrigation system. 3,888,281, Cl. 137-344.000.

Quaker Oats Company, The: *See—*
Brown, Lloyd H.; and Eftax, Daniel S. P., 3,888,816.
Snyder, Paul D.; and Crawford, Ralph W., 3,888,039.

Quint, Richard J., to Ethyl Corporation. Method of simultaneously coating the opposite sides of a paper web. 3,889,018, Cl. 427-209.000.

Quintron, Inc.: *See—*
Scurlock, Lawrence D., 3,889,166.

Quobex, Jean: *See—*
Lelaidier, Daniel; and Quobex, Jean, 3,889,172.

R. L. Kuss & Co., Inc.: *See—*
Hickle, Jerry J.; and Sherbourne, Robert D., 3,888,288.

Raabe, Ernst: *See—*
Hosterey, Hermann; Moller, Hans Horst; and Raabe, Ernst, 3,889,028.

Rach Heinz-Dieter: *See—*
Menell, Hans; and Rach Heinz-Dieter, 3,888,292.

Racky, Werner: *See—*
Kleiner, Hans-Jerg; Dursch, Walter; Stahler, Gerhard; and Racky, Werner, 3,888,930.

Radmann, Dietrich: *See—*
Bigalke, Erhard; Radmann, Dietrich; Klein, Erwin; Melichar, Rainer; and Biedermann, Kurt, 3,888,220.

Ram, Michael J.: *See—*
Manning, Andrew J.; and Ram, Michael J., 3,888,895.

Ramspeck, Howard B.; and Novak, Raymond F., to Duo-Fast Corporation. Safety for fastener driving tool. 3,888,404, Cl. 227-8.000.

Ramwell, Peter W., to Alza Corporation. Erodible intrauterine device. 3,888,975, Cl. 424-15.000.

Randall, Ronald Harold, to ACME Electric Corporation. Reactive regulator. 3,889,176, Cl. 323-8.000.

Rank Xerox, Limited: *See—*
Eto, Yoshio, 3,888,578.
Matsumoto, Seiji; and Tamai, Vasuo, 3,888,666.

Ravasz, Akos: *See—*
Schrewe, Klaus; Knipp, Ullrich; and Ravasz, Akos, 3,888,612.

Ravera, Giovanni; and Cosmo, Nicola, to Ing. C. Olivetti & C., S.p.A. Cutting device for cutting sheets from a roll in a copy machine. 3,888,147, Cl. 83-64.000.

Ray, James D. Trailer hitching coupler. 3,888,517, Cl. 280-512.000.

Rayon, Ronald G.: *See—*
Hartleroad, Ronald J.; Krajewski, James C.; and Rayon, Ronald G., 3,887,997.

Razdan, Raj K.: *See—*
Pars, Harry G.; and Razdan, Raj K., 3,888,946.

RCA Corporation: *See—*
Dingwall, Andrew Gordon Francis, 3,888,706.
Griffin, Earl Harris, 3,889,260.
Hanak, Joseph John; and Southgate, Peter David, 3,889,151.
Ross, Walter Lee, 3,889,253.
Torrington, Leslie Albert; and Stave, Frederick Roland, 3,888,493.
White, Joseph Paul; and Delpriore, Paul Joseph, 3,888,053.

Read, Colin Barrington, to Lever Brothers Company. Fat products. 3,889,011, Cl. 426-604.000.

Reardon, Daniel Francis, to Eastman Kodak Company. Method of preparing indophenols and oxichromic compounds. 3,888,926, Cl. 260-559.00A.

Rebentisch, Hugo E., to Unistrut Corporation. Support arrangement. 3,888,440, Cl. 248-73.000.

Rebentisch, Hugo E., to Unistrut Corporation. Support arrangement. 3,888,441, Cl. 248-73.000.

Redelfs, Hans, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Method of assembling an unloading crane. 3,888,356, Cl. 212-15.000.

Redmore, Derek, to Petrolite Corporation. Use as corrosion inhibitors: phenanthridine phosphonic compounds. 3,888,626, Cl. 21-2.50A.

Redmore, Derek, to Petrolite Corporation. Use as corrosion inhibitors: quinoline and isoquinoline phosphonates. 3,888,627, Cl. 21-2.50A.

Reece, Vernon N. Vehicle radiator protection device. 3,888,327, Cl. 180-68.00P.

Reed, Edgar A.; and Combos, E. Russell, to United States of America, Navy. Crown float/decelerator. 3,889,224, Cl. 340-2.000.

Reed, Irving S.; and Obenchain, Irving R., Jr., to Technology Service Corporation. Digital telephone switching system. 3,889,067, Cl. 179-18.00J.

Reese, Eckart: *See—*
Wank, Joachim; Reese, Eckart; Rohrbach, Josef; and Bruck, Rolf, 3,889,040.

Reese, Gerald D.; Shank, Gerald G.; and Carlson, Lowell D., to Textron Inc. Fuel injection system for two cycle engine. 3,888,214, Cl. 123-32.00A.

Regie Nationale des Usines Renault: *See—*
Larsonneur, Jean-Francois, 3,888,085.
Miokovic, Stevan, 3,888,216.

Rehman, Warren C.: *See—*
Jones, Gary V.; Pereira, John A.; and Rehman, Warren C., 3,888,999.

Reichhold Chemicals, Inc.: *See—*
Amundsen, Joseph; Wetzel, William H.; Naimy, Norma; and Goodwin, Robert J., 3,889,020.

Reichman, Steven H., to Federal-Mogul Corporation. Metal powder sintering process. 3,888,663, Cl. 75-221.000.

Reid, Charles M., to Elast-O-Cor Products & Engineering Limited. Covering for belt conveyor idler rolls. 3,888,131, Cl. 74-241.000.

Reifsnyder, Howard B., to Construction Specialties Inc. Expansion joint seal. 3,888,599, Cl. 404-69.000.

Reimann, Herbertus; and Clauss, Gunter, to Veb Pentalon Dresden. Storage and processing apparatus for record carriers. 3,888,365, Cl. 214-16.00B.

Reinbeck, Hans, to Robert Bosch G.m.b.H. Motor-driven vehicle with hybrid internal combustion and electrical drive. 3,888,325, Cl. 180-65.00A.

Reinecke, Erich; Isernhagen, Fritz; Klatt, Alfred; Weise, Lutz; Schlamann, Wilhelm; and Lindemann, Klaus, to Westinghouse Bremsen-und Apparatebau GmbH. Anti-wheel skid control system providing controlled reapplication of brake pressure. 3,888,550, Cl. 303-21.00P.

Reinhold, Herbert E., Jr.; and Toren, Richard B., to Survival Technology, Inc. Electrode assembly and methods of using the same in the respiratory and/or cardiac monitoring of an infant. 3,888,240, Cl. 128-2.06E.

Reliance Electric Company: *See—*
Downey, Holmes A., 3,888,093.

Rennick, John L., to Zenith Radio Corporation. Symmetrically encoded line sequential color signals. 3,889,288, Cl. 358-11.000.

Renshaw, Robin. Forming apparatus. 3,888,103, Cl. 72-399.000.

Repco Products Corporation: *See—*
Meyer, Eric A., 3,888,090.

Replogle, Daniel C. Three dimensional tic-tac-toe device. 3,888,487, Cl. 273-130.0AC.

Resag, Klaus: *See—*
Greve, Heinz Gunter; and Resag, Klaus, 3,888,899.

Ressorts du Nord S.A.: *See—*
Duchemin, Michel, 3,888,414.

Revesz, Clara, to American Home Products Corporation. Treatment of benign prostatic hypertrophy. 3,888,981, Cl. 424-242.000.

Rexnord Inc.: *See—*
Gley, Paul R., 3,887,966.

Reynard, Kennard A.: *See—*
Rose, Selwyn H.; and Reynard, Kennard A., 3,888,799.

Reynolds, Lawrence H.: *See—*
Smith, Verity C.; and Reynolds, Lawrence H., 3,888,519.

Reynolds, Richard Lee, to Illinois Tool Works Inc. Preassembled fastener unit. 3,888,289, Cl. 151-38.000.

Rheinstahl Henschel Aktiengesellschaft: *See—*
Dierkes, Hermann, 3,888,563.

Rhodes, John R., to Columbia Scientific Industries, Inc. Radioisotope-excited, energy-dispersive x-ray fluorescence apparatus. 3,889,113, Cl. 250-272.000.

Rhone-Progil: *See—*
Daumas, Jean Claude, 3,888,791.
Rivier, Georges, 3,888,929.

Rhudy, John S.; and Gogarty, William B., to Marathon Oil Company. Polymer waterflooding by controlling water hardness. 3,888,309, Cl. 166-274.000.

Ribback, Bernd. Forging machine. 3,888,104, Cl. 72-407.000.

Rice, Dennis A.: *See—*
Gorby, Oliver L.; and Rice, Dennis A., 3,888,372.

Richards, Louis R., to Formax, Inc. Food patty molding machine. 3,887,964, Cl. 17-32.000.

Richardson Company, The: *See—*
Chalex, Paul; and Mather, Selwyn R., 3,888,814.
Muzyczko, Thaddeus M.; and Jones, Thomas H., 3,888,671.

Richardson-Merrell Inc.: *See—*
Carr, Albert Anthony, 3,888,867.

Richter, Arend: *See—*
Eder, Hans; Meier, Heinz; and Richter, Arend, 3,888,479.

Richter Gedeon Vgyeszeti Gyzr Rt.: *See—*
Szantay, Csaba; Szabo, Lajos; Kreidl, Janos; Kalaus, Gyorgy; Keve, Tibor; Turczanyi, Peter; Polgar, Istvan; Farkas nee Kirjak, Maria; and Lakszner, Katalin, 3,888,865.

Richter, Sidney B.; and Krenzer, John, to Velsicol Chemical Corporation. N-alpha-haloacetyl-n-(1,3-dioxan-2-ylalkyl)anilids. 3,888,882, Cl. 260-340.700.

Rickter, Donald O.: *See—*
Bader, Henry; and Rickter, Donald O., 3,888,875.

Riddle, Neville L.: *See—*
Mandusky, Jack C.; and Riddle, Neville L., 3,888,473.

Ridge Tool Company, The: *See—*
Province, William F., 3,887,983.

Rieber & Son Plastic-Industri A/S: *See—*
Parmann, Gunnar, 3,887,992.

Riello Condizionatori S.A.S. di Giordano-Riello & Co: *See—*
Riello, Valerio Giordano, 3,887,977.

Riello, Valerio Giordano, to Riello Condizionatori S.A.S. di Giordano-Riello & Co. Method of producing air conditioners. 3,887,977, Cl. 29-157.00R.

Ritter, Esther: *See—*
Ritter, Herbert W., 3,889,248.

Ritter, Herbert W., to Ritter, Esther. Faulty battery connection indicator. 3,889,248, Cl. 340-249.000.

Ritzerfeld, Gerhard. Temperature responsive inking apparatus for a printing machine. 3,888,173, Cl. 101-350.000.

Rivers, Roy Wilben: *See—*
Perreault, Donald A.; Bedzyk, Victor Lee; Matthews, Larry Richard; Rivers, Roy Wilben; Shuey, David Rolling; and Torpie, John David, 3,889,057.

Rivier, Georges, to Rhone-Progil. Process for dehalogenation of polyhalogenated aromatic compounds. 3,888,929, Cl. 260-578.000.

Riviere, Jacques; and Simon, Raymond, to Lu, Brun & Associes S.A. Method of manufacturing twisted pastry articles. 3,889,012, Cl. 426-500.000.

Robbins, Ernest Aleck: *See—*
Newell, Jon Albert; Seeley, Robert Dudley; and Robbins, Ernest Aleck, 3,888,839.

Robert Bosch Fernsehanlagen G.m.b.H.: *See—*
Legler, Ernst, 3,889,051.

Robert Bosch G.m.b.H.: *See—*
Okuhara, Akira; Saiki, Masatoshi; and Saito, Nobuo, 3,888,224.
Reinbeck, Hans, 3,888,325.
Wessel, Wolf, 3,889,159.

Roberts, Allen C. Clipping device for fruit stems and the like. 3,888,006, Cl. 30-298.000.

Roberts, Joseph P.: *See—*
Hastings, Myron L.; and Roberts, Joseph P., 3,888,639.

Roberts, Larry W.: *See—*
Pierce, Edwin F.; Roberts, Larry W.; and Maddox, Leland D., 3,888,069.

Robertson, Gerald W.; and Sturgeon, Terence, to Uniroyal Inc. Floating boom. 3,888,086, Cl. 61-1.00F.

Robin, Allen M.: *See—*
Child, Edward T.; and Robin, Allen M., 3,888,043.

Robinson, Douglas N., to Dayco Corporation. Air gun. 3,888,422, Cl. 239-512.000.

Robinson, Kent W.: *See—*
Fentress, Denton C.; and Robinson, Kent W., 3,888,917.

Roch, Josef: *See—*
Narr, Berthold; Roch, Josef; Muller, Erich; and Nickl, Josef, 3,888,851.

Rockwell International Corporation: *See—*
Last, Bernard; Weinberger, Eugene M.; Gray, James R.; Clements, George W.; and Deffenbaugh, Ralph E., 3,888,106.
McCloskey, Albert R., 3,888,554.
Tartaglia, Ralph W., 3,888,280.
Tiernan, Stanley C.; and Berry, Ronald, 3,888,284.
Tuttle, Thomas J., 3,888,439.
Walker, Edward J., 3,889,118.

Rodek, Victor; and Ticknor, Raymond G., to Xerox Corporation. Digital controlled document feeder. 3,888,579, Cl. 355-14.000.

Rodzewich, Edward A., to Amchem Products, Inc. Cleaner for tin plated ferrous metal surfaces, comprising phosphate, silicate and borax. 3,888,783, Cl. 252-135.000.

Roe, Geoffrey Ernest; and Favill, John Edward, to Norton Villiers Limited. Exhaust silencers. 3,888,332, Cl. 181-53.000.

Roerig, Arnold J.: *See—*
Parker, Joseph D., deceased; Parker, Dorothy C., executrix; Hergert, Richard E.; and Roerig, Arnold J., 3,888,729.

Roetling, Paul G., to Xerox Corporation. Image subtraction apparatus. 3,888,591, Cl. 356-114.000.

Rogers, Dale W.: *See—*
Kiefer, Edward J.; and Rogers, Dale W., 3,888,583.

Rogerson, Jerry B., to Ford Motor Company. Throttle linkage including an overspeed protective device. 3,888,219, Cl. 123-97.00R.

Rohm GmbH: *See—*
Arndt, Peter Joseph; Pennewiss, Horst; Plainer, Hermann; Krall, Wilhelm; Masanek, Juergen; and Mueller, Manfred, 3,888,945.

Rohm and Haas Company: *See*—
Bayer, Horst O.; Swithenbank, Colin; and Yih, Roy Y., 3,888,932.
White, Michael L., 3,889,027.

Rohrbach, Josef: *See*—
Wank, Joachim; Reese, Eckart; Rohrbach, Josef; and Bruck, Rolf, 3,889,040.

Rollei-Werke Franke & Heidecke: *See*—
Sobotta, Reinhard, 3,888,462.

Ron, Benjamin. Combined power brake and antiskid actuators. 3,888,547, Cl. 303-21.00F.

Rosback, Donald H., to Universal Oil Products Company. Process for separating olefins by adsorption. 3,888,939, Cl. 260-677.0AD.

Rose, Selwyn H.; and Reynard, Kennard A., to Horizons Incorporated. Fluorophosphazene polymers curable at room temperature. 3,888,799, Cl. 260-2.00P.

Rosenberg, Robert E.: *See*—
Yie, Gene G.; Cummingham, S. J.; and Rosenberg, Robert E., 3,888,652.

Rosiak, Marion: *See*—
Bodine, Richard Hill, Jr.; and Rosiak, Marion, 3,889,152.

Ross, Milton Dean; Folk, Kenneth Foster; and Shatto, Walter Clifton, Jr., to Keating, William J., Esq. Method and apparatus for varying the relative length of a plurality of leads and for performing work operations on the ends of leads of differing relative length. 3,887,999, Cl. 29-628.000.

Ross, Walter Lee, to RCA Corporation. Raster-scan display system having improved means for reading out stored game-score information. 3,889,253, Cl. 340-323.000.

Rossmann, Dieter, to Carl Zeiss Stiftung. Photographic diaphragm control means. 3,889,283, Cl. 354-272.000.

Rosso, Charles. Fireman's pike pole or the like. 3,888,535, Cl. 294-19.00R.

Rothenstein, Julius, to United States of America, Navy. Flexible, self-supporting explosive composition. 3,888,707, Cl. 149-19.400.

Rothmans of Pall Mall Canada Limited: *See*—
Brackmann, Warren A.; and Diianni, Daniel, 3,888,610.

Rotramel, William J.: *See*—
Coghill, William W.; and Rotramel, William J., 3,888,635.

Roukema, Johannes; and Noordegraaf, Frederik, to B. V. Nederlandse Kraanbouw Maatschappij. Anode rod clamping assembly. 3,888,757, Cl. 204-297.00R.

Rounds, Gerald L., to Kaiser Steel Corporation. Method for removing deposits from interior surfaces of regenerative heat exchangers. 3,888,302, Cl. 165-1.000.

Rowland, Charles A. Adjustable hanger. 3,888,448, Cl. 248-328.000.

Rowlands, Martyn, to Bowater Packaging Limited. Container having a tamperproof closure. 3,888,383, Cl. 220-265.000.

Rubber Engineering, Inc.: *See*—
Jentzsch, David P.; Anderson, Hyrum T.; and Olsen, Lee J., 3,888,186.

Rubinstein, Leon: *See*—
Norris, Philip R.; and Rubinstein, Leon, 3,888,568.

Rubinstein, Morton K. Fluid injection system. 3,888,239, Cl. 128-2.00A.

Ruder, Ernest J.: *See*—
Jones, Thaddeus M.; Kiwalle, Jozef; and Ruder, Ernest J., 3,888,405.

Ruf, Erich: *See*—
Petrik, Bruno; and Ruf, Erich, 3,888,728.

Rumpelein, Fritz: *See*—
Kisselmann, Willy; Rumpelein, Fritz; and Kopf, Paul, 3,889,187.

Rushing, Frank C.; and Ley, Gordon S., to Westinghouse Electric Corporation. Oscillating scanner. 3,888,562, Cl. 350-7.000.

Russ, Paul E., Sr., to Gates Rubber Company, The. Positive drive belt and system. 3,888,132, Cl. 74-247.000.

Russell, Lewis B.; and Kelly, William F. Electronic timer printer. 3,889,103, Cl. 235-61.90A.

Russell, Wayne B., Jr. Protective device for preventing withdrawal of liquid from a tank. 3,888,381, Cl. 220-86.0AT.

Ruther, Heinz W.: *See*—
McKenzie, George J.; and Ruther, Heinz W., 3,889,225.

S.A. Automobiles Citroen: *See*—
Grosseau, Albert, 3,888,549.

S.A. des Anciens Etablissements Paul Wurth: *See*—
Kuntziger, Ernest P.; and Lemmens, Nicolas, 3,888,123.

S. J. a/k/a Agnew Environmental Products: *See*—
Hohmann, Robert C., 3,888,149.

S.R.M. Hydromekanik Aktiebolag: *See*—
Ahlen, Karl Gustav, 3,888,141.

Saajos, Jaakko. Damping assemblies for doors or the like. 3,887,961, Cl. 16-56.000.

Saeed, Sheik Arshad. Apparatus for large scale gel electrophoresis. 3,888,758, Cl. 204-299.000.

Saft-Societe des Accumulateurs Fixes et de Traction: *See*—
Lelaidier, Daniel; and Quobex, Jean, 3,889,172.

Saiki, Masatoshi: *See*—
Okuhara, Akira; Saiki, Masatoshi; and Saito, Nobuo, 3,888,224.

Saint Eve, Daniel R.; and Bose, Ajit Kumar, to Leco Industries Limited. Apparatus for producing films in accordance with the blown tube process. 3,888,609, Cl. 425-72.000.

Saito, Nobuo: *See*—
Okuhara, Akira; Saiki, Masatoshi; and Saito, Nobuo, 3,888,224.

Saitoh, Takeshi: *See*—
Matsuura, Shigeo; Saitoh, Takeshi; and Miyamoto, Hiroshi, 3,889,210.

Sakakibara, Hiroyuki: *See*—
Ishizaki, Ayaaki; Morinaga, Yasushi; Sakakibara, Hiroyuki; and Horiuchi, Masao, 3,888,740.

Sakayanagi, Sadao: *See*—
Iizuka, Hiroshi; Seto, Naosuke; and Sakayanagi, Sadao, 3,888,736.

Sakurai, Itaru, to Toyoda-Koki Kabushiki Kaisha. Control device for multi-axis servo-actuators. 3,889,238, Cl. 340-172.500.

Salkin, Burton: *See*—
May, Edwin A.; Salkin, Burton; and McDonald, Harold Paul, Jr., 3,888,235.

Salminen, Olli Olavi: *See*—
Jarvinen, Uro Tapio; and Salminen, Olli Olavi, 3,887,957.

Salt, Trevor L., to General Electric Company. Method of making, and of measuring article fatigue life. 3,887,987, Cl. 29-407.000.

Samaun: *See*—
Wise, Kensall D.; and Samaun, 3,888,708.

Samiran, David; and Moore, Arthur H. Multiple coil wire lock arrangement. 3,888,598, Cl. 403-372.000.

Sample, Thomas E., Jr.: *See*—
Schievelbein, Vernon H.; and Sample, Thomas E., Jr., 3,888,310.

Sampson, Ronald Lee; and Whyte, David Denzil, to Procter & Gamble Company, The. Beverage carbonation. 3,888,998, Cl. 426-67.000.

Sanders, Edgar R.: *See*—
Urschel, Joe R.; and Sanders, Edgar R., 3,888,426.

Sanders, Murray J. Modified neurotoxin. 3,888,977, Cl. 424-98.000.

Sandoz, Inc.: *See*—
Anderson, Paul L., 3,888,933.
Anderson, Paul L., 3,888,934.
Bacso, Imre, 3,888,849.
Bastian, Jean-Michel; and Hasspacher, Klaus, 3,888,829.
Baumann, Hans-Peter; and Keller, Robert-Christian, 3,888,913.
Eberle, Marcel K., 3,888,920.
Entschel, Roland; and Kaeppeli, Viktor, 3,888,850.
Hiler, Albert R., 3,888,279.
Houlihan, William J.; and Nadelson, Jeffrey, 3,888,900.
Jackson, Thomas E., 3,888,870.
Manning, Robert E., 3,888,853.

Sanner, George E., to Santron Corporation. Fluid flow systems. 3,888,275, Cl. 137-391.000.

Sansui Electric Co., Ltd.: *See*—
Ito, Ryosuke; and Takahashi, Susumu, 3,889,061.

Santos, Anthony J.: *See*—
Mazzeo, Charles F.; and Santos, Anthony J., 3,887,981.

Santron Corporation: *See*—
Sanner, George E., 3,888,275.

Sarbacher, Robert I.; and Mauch, Robert E., to Bogue, John C. Battery charge rate control. 3,889,170, Cl. 320-14.000.

Sasaki, Tadao; Kato, Yasuji; and Meguro, Toshiaki, to Sony Corporation. Automatic frequency control circuit. 3,889,193, Cl. 325-419.000.

Satake, Tadashi: *See*—
Taguchi, Kazuo; and Satake, Tadashi, 3,888,637.

Satake, Tomomitsu: *See*—
Okada, Takashi; Yamagishi, Sokichi; Kamoshida, Mototaka; Satake, Tomomitsu; and Kishi, Sadayuki, 3,887,993.

Sato, Mikio: *See*—
Toriyama, Kazuhisa; Nakano, Fumio; Sato, Mikio; Abe, Hidetoshi; and Kanazaki, Mikio, 3,888,566.

Sato, Yasuaki: *See*—
Inoue, Yoshio; and Sato, Yasuaki, 3,888,364.

Satoh, Ryosuke: *See*—
Fujiwhara, Mitsuto; Kasai, Keiji; Satoh, Ryosuke; Nakagawa, Yoshinobu; and Tanigawa, Tuneo, 3,888,680.

Saunders, Rhoderick K.: *See*—
Gale, Walter W.; Ashcraft, Thomas L., Jr.; and Saunders, Rhoderick K., 3,888,308.

Sawada, Katsuo: *See*—
Yoshikawa, Hiromi; Sawada, Katsuo; Asanari, Shigeyuki; Kajikawa, Saburo; and Kodama, Takao, 3,888,643.

Sawyer, Willard H.: *See*—
Arey, William F., Jr.; and Sawyer, Willard H., 3,888,793.

Saylor, Richard: *See*—
Nagel, Robert H.; and Saylor, Richard, 3,889,054.

Schaferetiketten, Hubert H. Schafer: *See*—
Spannknebel, Walter; and Wicenec, Leopold, 3,888,724.

Scheibitz, Wolfgang; Staendeke, Horst; and Burkhardt, Siegfried, to Hoechst Aktiengesellschaft. Process for the manufacture of hypophosphites. 3,888,971, Cl. 423-307.000.

Schering Corporation: *See*—
Lehn, Jean-Marie, 3,888,877.
Panitz, Eric; and Daniels, Peter J. L., 3,888,986.

Schevey, William Russell; Jones, Harold Freeman; and Spielman, Burton A., to Allied Chemical Corporation. Multi-phase rinse and recovery method. 3,888,693, Cl. 134-10.000.

Schiebelhuth, Heinz; and Bauer, Herbert, to Braun AG. Arrangement for suppressing noise in an FM receiver. 3,889,192, Cl. 325-348.000.

Schiel, Ernst J., to United States of America, Army. Avalanche photodiode with varying bandgap. 3,889,284, Cl. 357-30.000.

Schievelbein, Vernon H.; and Sample, Thomas E., Jr., to Texaco Inc. Process for inhibiting scale deposition. 3,888,310, Cl. 166-279.000.

Schillinger, David E. Method of bonding an annular band of material to an object. 3,888,295, Cl. 164-72.000.

Schlamann, Wilhelm: *See*—
Reinecke, Erich; Isernhagen, Fritz; Klatt, Alfred; Weise, Lutz; Schlamann, Wilhelm; and Lindemann, Klaus, 3,888,550.

Schlosser, Karl, to Siemens Aktiengesellschaft. Digital circuit for the control of a variable frequency oscillator. 3,889,204, Cl. 331-1.00A.

Schmidt, Heinrich Gottlieb; Strauss, Kunc Gustav; and Tennikat, Josef, to Lever Brothers Company. High pressure injection of a fatty in aqueous phase. 3,889,004, Cl. 426-188.000.

Schmidt, John C. Motion picture toy. 3,888,571, Cl. 352-87.000.

Schmieder, Drucilla. Teaching game. 3,888,025, Cl. 35-35.00H.

Schneekloth, Ulrich H., to General Electric Company. Automatic back up of a numerical control. 3,889,105, Cl. 235-151.110.

Schneider, Rudolf: *See—*
Abele, Werner; and Schneider, Rudolf, 3,888,677.

Schneider, William P., to Upjohn Company, The. Process for extracting prostaglandins. 3,888,904, Cl. 260-468.00D.

Schneider, William P.: *See—*
Pike, John E.; and Schneider, William P., 3,888,919.

Schnettler, Richard A.; and Suh, John T., to Colgate-Palmolive Company. 3-[2-(4-Thienoylpiperazin-1-yl)ethyl]indoles. 3,888,860, Cl. 260-268.0BC.

Schnettler, Richard A.; and Suh, John T., to Colgate-Palmolive Company. 3-[2-(4-Substituted-piperazin-1-yl)ethyl]indoles. 3,888,861, Cl. 260-268.0BC.

Schonewald, Roger L., to Ingersoll-Rand Company. Blow molding process including article cooling. 3,888,961, Cl. 264-89.000.

Schotten, Alfons; and Heimbach, Franz, to Eberhard Hoesch & Sohne. Securing device for press diaphragms in plate filter presses. 3,888,769, Cl. 210-227.000.

Schrewe, Klaus; Knipp, Ullrich; and Ravasz, Akos, to Imperial Chemical Industries Limited. Injection moulding means for forming a composite product. 3,888,612, Cl. 425-130.000.

Schrieber, Henry H.: *See—*
Kelly, Vincent M.; and Schrieber, Henry H., 3,888,056.

Schroeder, Rondon L.: *See—*
Bourne, Henry A., Jr.; and Schroeder, Rondon L., 3,888,319.

Schubert, Wilfried, to National Advertising Company. Changeable multiple image display apparatus. 3,888,029, Cl. 40-125.00G.

Schuckman, Frederick E.: *See—*
Devon, Harry J., 3,888,620.

Schultz, Harold P.: *See—*
Anderson, Richard S.; Crafts, Robert L.; Murphy, John A.; Patterson, Irvin L.; and Schultz, Harold P., 3,889,294.

Schulz, Helmut Hasso: *See—*
Herger, Horst; and Schulz, Helmut Hasso, 3,889,236.

Schuman, Paul D.; and Stump, Eugene C., Jr., to PCR, Inc. Bis-triazine compounds. 3,888,854, Cl. 260-248.0CS.

Schuplin, Jerome T., to Fastway Fasteners, Inc. Bundling tie. 3,887,965, Cl. 24-16.0PB.

Schurdak, Edward Joseph, to American Cyanamid Company. Copper inhibitors for polyolefins. 3,888,825, Cl. 260-45.85B.

Schwartz, Joseph R.: *See—*
Pardes, Herman I.; Schwartz, Joseph R.; and Sherburne, Frederick B., 3,888,022.

Schwartz, Robert J., to Texas Instruments Incorporated. Strain sensor. 3,888,115, Cl. 73-88.50R.

Schweriner, Harold A.: *See—*
Arden, Richard J.; and Schweriner, Harold A., 3,888,586.

Scientific Drilling Controls: *See—*
Zuvela, Bernard R., 3,888,201.

SCM Corporation: *See—*
Harmon, James E.; Watrous, Stephen R.; and Diamond, Herrick R., 3,887,963.
Klar, Erhard; and Weaver, Elbert K., 3,888,657.

Scripto, Inc.: *See—*
Vaughan, Harry L., 3,888,286.

Scurlock, Lawrence D., to Quintron, Inc. Automatic frequency control for a sandwich transducer using voltage feedback. 3,889,166, Cl. 318-116.000.

Sczerzenie, Francis E.; and Zaleski, Frank I., to United States of America, Army. High density, high ductility, high strength tungsten-nickel-iron alloy & process of making therefor. 3,888,636, Cl. 29-182.000.

Seal Incorporated: *See—*
Gibbs, David A.; and Humphries, Donald N., 3,888,719.

Seal Spout Europe S.p.A.: *See—*
Taddei, Carlo, 3,888,164.

Sealey, Francis, to Boeing Company, The. Airplane landing gear shock absorber. 3,888,436, Cl. 244-104.0FP.

Seaton, William J., to Cree, George B., Jr. Process of preparing and delivering plurality of audible messages and apparatuses therefor. 3,889,290, Cl. 360-12.000.

Sedam, Jason K., to Coca-Cola Company, The. Agitating apparatus. 3,888,466, Cl. 259-44.000.

Seeley, Robert Dudley: *See—*
Newell, Jon Albert; Seeley, Robert Dudley; and Robbins, Ernest Aleck, 3,888,839.

Seidel, William C.: *See—*
Mitchell, William A.; Stahl, Howard D.; and Seidel, William C., 3,889,008.

Seifert, Walter F.: *See—*
Jackson, Larry L.; Seifert, Walter F.; and Collins, Daniel E., 3,888,777.

Seilenbinder, Richard W., to Briggs & Stratton Corporation. Vibration absorbing mounting element. 3,888,450, Cl. 248-358.00R.

Seiner, Jerome A.: *See—*
Doerge, Herman P.; Slater, Charles G.; and Seiner, Jerome A., 3,888,803.

Seith, Robert T.; and Bundy, Otto M., to Gulf States Paper Corporation. Devices, systems and methods employing knitted fabric mulch. 3,888,041, Cl. 47-9.000.

Seith, Robert T.; and Bundy, Otto M., to Gulf States Paper Corporation. Devices, systems and methods employing knitted fabric mulch. 3,888,197, Cl. 111-1.000.

Seith, Robert T.; and Bundy, Otto M., to Gulf States Paper Corporation. Devices, systems and methods employing knitted fabric mulch. 3,888,418, Cl. 239-145.000.

Sekine, Noriyuki: *See—*
Nakashio, Seizo; Sekine, Noriyuki; Toyota, Nobuhiro; and Fujita, Fumio, 3,888,809.

Sekiya, Tetsuo: *See—*
Yoshida, Kenji; Sekiya, Tetsuo; and Higo, Toyokazu, 3,888,403.

Sella, Lino; and Dalmasso, Claudio, to Ing. C. Olivetti & C., S.p.A. Resistor trimming technique. 3,889,223, Cl. 338-195.000.

Sellstedt, John H.; Guinosso, Charles J.; and Bell, Stanley C., to American Home Products Corporation. 3,4-Dihydro-4-oxo-2-quinazolinecarboxylic acids, salts and esters as anti-allergic agents. 3,888,858, Cl. 260-251.0QA.

Sen, Durgacharan: *See—*
Foster, William R.; Sen, Durgacharan; and Skinner, Stanley J., 3,888,614.

Senoski, Walter E. Model rocket-glider. 3,888,178, Cl. 102-34.100.

Sente, Toru: *See—*
Kishigami, Kunio; Kobayashi, Hiroshi; Sente, Toru; and Sugiyama, Koichi, 3,888,194.

Senzaki, Yoshimichi: *See—*
Ogasawara, Takahisa; Senzaki, Yoshimichi; Kato, Hiroyuki; and Tatemichi, Hidemaro, 3,888,830.

Seperic: *See—*
Baetz, Jacques L. E., 3,888,983.

Seto, Naosuke: *See—*
Iizuka, Hiroshi; Seto, Naosuke; and Sakayanagi, Sadao, 3,888,736.

Seven, Manfred K.: *See—*
Dench, John E.; Knutson, Harry; and Seven, Manfred K., 3,888,911.

Shaffer, Leon L.: *See—*
Costello, Anthony C.; and Shaffer, Leon L., 3,888,430.

Shah, Praful H.; and Srinivasan, Subramania, to Personal Products Company. Sanitary napkin having improved attachment system. 3,888,255, Cl. 128-290.00R.

Shamlian, Ralph B.; and Hollingsworth, Ashley J., to Farallon Industries, Inc. Portable underwater indicating instrument for divers. 3,888,127, Cl. 73-431.000.

Shamrock Chemicals Limited: *See—*
Shirley, Samuel John, 3,888,653.

Shank, Gerald G.: *See—*
Reese, Gerald D.; Shank, Gerald G.; and Carlson, Lowell D., 3,888,214.

Sharki, Martin James; and Miller, Clell D., to Dresser Industries, Inc. Gas dilution unit. 3,888,109, Cl. 73-23.000.

Sharp, Denis, to U.S. Philips Corporation. Anti-lock vehicle brake system. 3,888,548, Cl. 303-21.0CG.

Shatto, Walter Clifton, Jr.: *See—*
Ross, Milton Dean; Folk, Kenneth Foster, and Shatto, Walter Clifton, Jr., 3,887,999.

Shaw, George W., Jr., to Cincinnati Electronics Corporation. Tapered detector scanning array system. 3,889,117, Cl. 250-332.000.

Shaw-Walker Company: *See—*
Anderson, Clarence A. F.; and Laird, Robert A., 3,888,557.

Sheets, Charles W. Concrete holding and mixing assembly and method of transporting and distributing concrete. 3,888,467, Cl. 259-148.000.

Sheilds, J. Rodger; and Carroll, Alexander A. Stator blade assembly for turbo machines. 3,887,976, Cl. 29-156.80R.

Shell Oil Company: *See—*
Closmann, Philip J., 3,888,307.

Shen, Tsung-Ying; Greenwald, Richard B.; Jones, Howard; Linn, Bruce O.; and Witzel, Bruce E., to Merck & Co., Inc. Cyano-indenyl acetic acids. 3,888,902, Cl. 260-465.00D.

Sherbourne, Robert D.: *See—*
Hickle, Jerry J.; and Sherbourne, Robert D., 3,888,288.

Sherburne, Frederick B.: *See—*
Pardes, Herman I.; Schwartz, Joseph R.; and Sherburne, Frederick B., 3,888,022.

Sherman, George R., to General Electric Company. Shaft bushing to prevent soil migration. 3,887,960, Cl. 16-2.000.

Shibamoto, Iwao. Inflatable vehicle safety device. 3,888,505, Cl. 280-150.0AB.

Shibata, Fukuo, to Kawasaki Jukogyo Kabushiki Kaisha. Electric control system for driving an electric vehicle including first and second converters. 3,889,127, Cl. 290-14.000.

Shih, Chi-kai, to du Pont de Nemours, E. I., and Company. Blends of propylene-alpha-olefin copolymers and polypropylene. 3,888,949, Cl. 260-897.00A.

Shima, Takeo: *See—*
Ogasawara, Makoto; Suzuki, Kazuyoshi; Urasaki, Takanori; Shima, Takeo; Kurisu, Shizuka; and Hirabayashi, Yasuji, 3,888,938.

Shimatani, Shiro: *See—*
Fujii, Masao; Shimatani, Shiro; Orita, Ryoji; and Takemoto, Isao, 3,888,575.

Shimizu, Takeshi: *See—*
Hamakawa, Hiroshi; Kobari, Sadami; Shimizu, Takeshi; Fujimoto, Kentaro; Hayano, Kazuo; and Matsuda, Tetsuo, 3,888,927.

Shindo, Masanari, to Konishiroku Photo Industry Co., Ltd. Process for preparation of a film of lead monoxide. 3,888,634, Cl. 23-305.000.

Shinoda, Naoharu: *See—*
Atsukawa, Masumi; Shinoda, Naoharu; and Kuwubara, Haruo, 3,888,968.

Shinomura, Toshihiko, to Nippon Oil Co., Ltd. Thermoplastic resin composition including wood and fibrous materials. 3,888,810, Cl. 260-17.4BB.

Shirai, Osamu, to Kabushiki Kaisha Cosina. Electronic shutter control device for cameras. 3,889,276, Cl. 354-31.000.

Shirley, Samuel John, to Shamrock Chemicals Limited. Method of producing plant food. 3,888,653, Cl. 71-61.000.

Shkola, Andrei Antonovich: *See—*
Vlasenko, Natalya Andreevna; Gergel, Alla Nikolaevna; and Shkola, Andrei Antonovich, 3,889,016.

Shoemaker, Arthur H., to American Optical Corporation. 10X three element eyepiece. 3,888,567, Cl. 350-229.000.

Shoupp, William E.; and Bechtold, James H., to Westinghouse Electric Corporation. Process for the direct reduction of iron ore to steel. 3,888,658, Cl. 75-11.000.

Shuey, David Rolling: *See—*
Perreault, Donald A.; Bedzyk, Victor Lee; Matthews, Larry Richard; Rivers, Roy Wilben; Shuey, David Rolling; and Torpie, John David, 3,889,057.

Siddall, John B. Unsaturated amides. 3,888,893, Cl. 260-404.000.

Side, Anthony J.; and McDonald, Bernard. Powder inhaler. 3,888,252, Cl. 128-266.000.

Siemens Aktiengesellschaft: *See—*
Assmus, Ulf E.; Bartel, Willy; and Hessenmuller, Horst, 3,889,235.
Menzel, Willi; and Milde, Gundolf, 3,889,129.
Olsen, Willi; Lorenz, Dieter; and Beer, Heinz, 3,889,076.
Schlosser, Karl, 3,889,204.

Sigmon Corporation: *See—*
Sigmon, James W., 3,888,460.

Sigmon, James W., to Sigmon Corporation. Ball valve compression seat. 3,888,460, Cl. 251-315.000.

Silbermann, Menahem: *See—*
Avital, Shlomo; Silbermann, Menahem; and Elson, David, 3,888,770.

Silverstein, Joseph J., to Ore-Lube Corporation, The. Two-cycle engine oil. 3,888,776, Cl. 252-25.000.

Simco Company, Inc., The: *See—*
Arden, Richard J.; and Schweriner, Harold A., 3,888,586.

Simhan, Krishna, to PPG Industries, Inc. Nozzle for chemical vapor deposition of coatings. 3,888,649, Cl. 65-60.000.

Simokat, Frank L.; and Greene, Clifford E., to Superior Continental Corporation. Relay range extender for telephone systems. 3,889,066, Cl. 179-16.00F.

Simon, Raymond: *See—*
Riviere, Jacques; and Simon, Raymond, 3,889,012.

Simpkin, Sidney David: *See—*
Cunningham, Christopher; and Simpkin, Sidney David, 3,888,735.

Simpson, Fred E.: *See—*
Bauer, Ralph L.; and Simpson, Fred E., 3,888,357.

Sims, Anson, to California R & D Center. Board game apparatus. 3,888,488, Cl. 273-131.0BA.

Sims, Rex J.: *See—*
Buide, Norma F.; Lugay, Joaquin C.; and Sims, Rex J., 3,889,001.

Sinkula, Anthony A., to Upjohn Company, The. Amantadine salt of 16,16-dimethyl-PGE_2. 3,888,916, Cl. 260-501.100.

Sinobad, Dusan, to Compagnie Industrielle des Telecommunications Cit-Alcatel. Graphic data display system with multiple display inhibit delay times. 3,889,244, Cl. 340-173.0CR.

Sipos, Endre F.: *See—*
Turro, Eugene J.; and Sipos, Endre F., 3,888,996.

Sirota, Jilius; Forsyth, Robert S.; and Fergesen, David, to National Starch and Chemical Corporation. Water-moistenable hot-melt applicable adhesive composition. 3,888,811, Cl. 260-23.00R.

Sirven, Jacques, to Thomson-CSF. Range measurement pulse radar system. 3,889,261, Cl. 343-14.000.

Siskin, Michael; and Wristers, Jos P., to Exxon Research and Engineering Company. Catalytic hydrogenation with a mixture of metal halide and anhydrous protonic acid. 3,888,937, Cl. 260-667.000.

Sisson, Ronald Loren: *See—*
Patton, Jon Richard; and Sisson, Ronald Loren, 3,888,323.

Sitek, George J.: *See—*
Wiiki, Leroy E.; and Sitek, George J., 3,888,321.

Skaggs, John H.: *See—*
Adams, David O., Jr.; and Skaggs, John H., 3,888,114.

Skala, Stephen F. Thermal exchange fluid preparation of foods. 3,888,303, Cl. 165-2.000.

Skinner, Stanley J.: *See—*
Foster, William R.; Sen, Durgacharan; and Skinner, Stanley J., 3,888,614.

Slater, Charles G.: *See—*
Doerge, Herman P.; Slater, Charles G.; and Seiner, Jerome A., 3,888,803.

Slavin, Martin J., to Phonplex Corporation. Multiplexed digital data communication system. 3,889,063, Cl. 179-15.00A.

Smeets, Fred, to La Citrique Belge, N.V. Surfactive material and its preparation. 3,888,910, Cl. 260-479.00R.

Smith, Carl Mayn; and Van Dyke Tiers, George, to Minnesota Mining and Manufacturing Company. Silicone-compatible dyestuffs. 3,888,891, Cl. 260-375.00B.

Smith, Craig A., to Xerox Corporation. Semi-automatic document handler. 3,888,584, Cl. 355-75.000.

Smith, James I.; and McGann, James E., to General Electric Company. Electrical terminal configuration. 3,888,560, Cl. 339-59.00R.

Smith, Philip L., to Aero Industries, Inc. Altitude digitizer. 3,889,104, Cl. 235-150.200.

Smith, Thomas David. Safety closures. 3,888,374, Cl. 215-216.000.

Smith, Verity C.; and Reynolds, Lawrence H., to Vaponics, Inc. Coupling and fitting for lined tubing. 3,888,519, Cl. 285-55.000.

Smiths Industries Limited: *See—*
Cross, David Edward, 3,888,126.

Snam-Progetti S.p.A.: *See—*
Gambini, Arnaldo; and Capitelli, Giacomo, 3,889,116.

Snapp, Thomas C., Jr.; and Blood, Alden E., to Eastman Kodak Company. Synthesis of diether-aldehydes and diether-alcohols. 3,888,880, Cl. 260-340.600.

Snyder, Bernard Rex. Locking device for a positioning means of a conveyor pressure roller. 3,888,343, Cl. 198-127.00R.

Snyder, Paul D.; and Crawford, Ralph W., to Quaker Oats Company, The. Foldable toy building. 3,888,039, Cl. 46-12.000.

Sobel, Jay E., to Universal Oil Products Company. Process for producing alkyl fluorides from mono-olefins. 3,888,935, Cl. 260-653.600.

Sobotta, Reinhard, to Rollei-Werke Franke & Heidecke. Photographic projector with fader device. 3,888,462, Cl. 353-29.000.

Societe Anonyme de Telecommunications: *See—*
Gauthier, Andre, 3,887,995.

Societe Anonyme: Poclain: *See—*
Moreau, Rene V., 3,888,371.

Societe Anonyme: Societe Industrielle de Combustible Nucleaire: *See—*
Guichard, Claude; and Soret, Jean-Claude, 3,888,300.

Societe Aquitaine-Total Organico: *See—*
Biensan, Michael; and Potin, Philippe, 3,888,832.

Societe Corobit Anstalt: *See—*
Delessert, Marcel, 3,888,518.

Societe Cortial: *See—*
Cazaux, Michel; and Cros, Jean, 3,888,842.

Societe dite: Automobiles Peugot: *See—*
Miokovic, Stevan, 3,888,216.

Societe Honeywell Bull (Societe Anonyme): *See—*
Gillissen, Johannes Jacobus, 3,889,239.

Sodeco-Saia AG.: *See—*
Gautschi, Kurt, 3,888,267.

Sogn, Allen W.: *See—*
Gilleo, Kenneth B.; Evans, Francis E.; and Sogn, Allen W., 3,888,822.

Soh, Jin Y.: *See—*
Klusmann, Donald L.; Soh, Jin Y.; and Whitaker, Roger B., 3,889,173.

Soiltest, Inc.: *See—*
Nims, Jerry R., 3,888,118.

Solomon, Elias E., to Gulf & Western Manufacturing Company. Active frequency-responsive glass breakage detector. 3,889,250, Cl. 340-274.000.

Solvay & Cie: *See—*
Deblandre, Claude; and Guyaux, Jean, 3,888,818.

Soma, Ikuo: *See—*
Tanaka, Hiroshi; Soma, Ikuo; Ito, Yoshikazu; and Kamijo, Masayasu, 3,889,033.

Sony Corporation: *See—*
Ishikawa, Yoji, 3,889,218.
Sasaki, Tadao; Kato, Yasuji; and Meguro, Toshiaki, 3,889,193.
Yoshida, Kenji; Sekiya, Tetsuo; and Higo, Toyokazu, 3,888,403.

Soret, Jean-Claude: *See—*
Guichard, Claude; and Soret, Jean-Claude, 3,888,300.

Sorice, Edward L., to Kennametal Inc. Cutting insert and holder therefor. 3,887,974, Cl. 29-95.00R.

Sorice, Edward L.; and Friedline, Ernest J., to Kennametal Inc. Slotting cutter and cutting insert therefor. 3,887,975, Cl. 29-105.00R.

Southern California Gas Company: *See—*
Yie, Gene G.; Cummingham, S. J.; and Rosenberg, Robert E., 3,888,652.

Southgate, Peter David: *See—*
Hanak, Joseph John; and Southgate, Peter David, 3,889,151.

Sovex Limited: *See—*
Geller, Stephen, 3,888,342.

Spannknebel, Walter; and Wicenec, Leopold, to Schaferetiketten, Hubert H. Schafer. Labeling machine. 3,888,724, Cl. 156-541.000.

Spartanics, Ltd.: *See—*
Mohan, William L.; and Willits, Samuel P., 3,889,136.

Speller, Jack B. Long life reliable relay. 3,889,131, Cl. 307-136.000.

Spencer, David L. Arterial infusion catheter. 3,888,249, Cl. 128-214.00R.

Spengler, Erich: *See—*
Deiss, Hans-Dieter; Spengler, Erich; and Georges, Gerard, 3,889,273.

Speno International S.A.: *See—*
Panetti, Romolo, 3,888,052.

Sperry Rand Corporation: *See—*
Alderman, Albert D., Jr.; and Cherian, Gabriel B., 3,888,478.
Alferness, Merwin H.; and Miller, John A., 3,889,237.
Bennett, Clarence L., Jr.; De Lorenzo, Joseph D.; and Durling, Hubert P., Jr., 3,889,249.
Chapman, Arthur John, 3,888,424.

Spielman, Burton A.: *See—*
Schevey, William Russell; Jones, Harold Freeman; and Spielman, Burton A., 3,888,693.

Spietschka, Ernst; and Landler, Josef, to Hoechst Aktiengesellschaft. Process for diazotizing aromatic amines. 3,888,841, Cl. 260-141.000.

Spinella, Rinaldo A., to Massachusetts Institute of Technology. Digital torquemeter and the like. 3,888,116, Cl. 73-136.00A.

Spodig, Heinrich. Stacked magnetic arrangement. 3,889,220, Cl. 335-306.000.

Srinivasan, Subramania: *See*—
Shah, Praful H.; and Srinivasan, Subramania, 3,888,255.

Stacey, Thomas A., Jr., to General Motors Corporation. Constant speed responsive spark controller. 3,888,221, Cl. 123-117.00A.

Stadler, Reinhard. Closure cap for an infusion flask. 3,888,377, Cl. 215-249.000.

Staendeke, Horst: *See*—
Scheibitz, Wolfgang; Staendeke, Horst; and Burkhardt, Siegfried, 3,888,971.

Stahl, Howard D.: *See*—
Mitchell, William A.; Stahl, Howard D.; and Seidel, William C., 3,889,008.

Stahle, Helmut: *See*—
Koppe, Herbert; Stahle, Helmut; Kummer, Werner; Muacevic, Gojko; and Traunecker, Werner, 3,888,898.

Stahler, Gerhard: *See*—
Kleiner, Hans-Jerg; Dursch, Walter; Stahler, Gerhard; and Racky, Werner, 3,888,930.

Stahlschmitt, Horst: *See*—
Bauer, Wilhelm; and Stahlschmitt, Horst, 3,888,198.

Stamper, Robin Harry. Conditioning device for deodorising and/or odourising air. 3,887,948, Cl. 4-213.000.

Standby Systems, Inc.: *See*—
Hunter, Thomas C., Jr., 3,889,171.

Stanford University: *See*—
Meindl, James D.; and Hottinger, Charles F., 3,888,238.

Stanley Denki Kabushiki Kaisha: *See*—
Teshima, Toru; Nagasao, Toshiie; Tanaka, Minoru; Ariga, Kazuo; and Inoue, Kiyoshi, 3,888,756.

Stanley Works, The: *See*—
Graham, James Joseph, 3,888,002.
Hyde, Robert Steven; and De Jong, Maarten Cornelis, 3,888,010.

Starkie, Granville Lewis, to A.P.V. Company Limited, The. Heat treatment of particulate solid materials in continuous flow. 3,888,167, Cl. 99-467.000.

Starks, Charles M., to Continental Oil Company. Preparation of alkyl vinyl ethers. 3,888,931, Cl. 260-611.00A.

Starn, Roy Emerson, Jr.: *See*—
Blackwell, John; Gumprecht, William H.; and Starn, Roy Emerson, Jr., 3,888,624.

Starrett, Herman P.; and Bamberger, George D. Baseball pitcher's training device. 3,888,482, Cl. 273-26.00C.

Stauffer Chemical Company: *See*—
Fancher, Llewellyn W., 3,888,906.
Pallos, Ferenc M.; and Menn, Julius J., 3,888,888.
Pallos, Ferenc M.; and Tseng, Chien K., 3,888,987.

Stave, Frederick Roland: *See*—
Torrington, Leslie Albert; and Stave, Frederick Roland, 3,888,493.

Steelastic Company, The: *See*—
Alderfer, Sterling W., 3,888,713.

Steelcase Inc.: *See*—
Fries, Bernard J.; and McLander, Lance E., 3,888,613.

Stegelman, Albert F.: *See*—
Erickson, Wayne K.; and Stegelman, Albert F., 3,887,969.

Steinbrook, Seymour E.: *See*—
Kent, Francis Joseph; and Steinbrook, Seymour E., 3,888,168.

Steinmetz, Anthony; and Walstra, Hidde, to U.S. Philips Corporation. Switching device having contacts of two or more layers. 3,889,098, Cl. 200-268.000.

Stella, Joseph A., to Polaroid Corporation. Film guiding playback and recording mechanism. 3,888,570, Cl. 352-29.000.

Stenvall, Carl B., to Minnesota Mining and Manufacturing Company. First aid bandage. 3,888,247, Cl. 128-155.000.

Stephenson, Robert L., to Allied Chemical Corporation. Belt locking assembly for safety belt buckle. 3,888,541, Cl. 297-388.000.

Stephenson, Ronald Arthur; Laursen, Bente Lissy; and Mattsson, Ove Henning, to Kemanord Aktiebolag. Bis-biguanides. 3,888,947, Cl. 260-501.110.

Sternbach, Leo Henryk: *See*—
Metlesics, Werner; and Sternbach, Leo Henryk, 3,888,846.

Stevens, William H., to Atomic Energy of Canada Limited. Process for hydrogen isotope exchange and concentration between liquid water and hydrogen gas and catalyst assembly therefor. 3,888,974, Cl. 423-580.000.

Stevenson, Paul D.: *See*—
Green, Raymond J.; and Stevenson, Paul D., 3,888,227.

Stewart, Alan, to International Telephone and Telegraph Corporation. Bi-directional amplification apparatus. 3,889,072, Cl. 179-170.00R.

Stewart, Norman C., to Cities Service Research & Development Co. H-oil process. 3,888,761, Cl. 208-112.000.

Stolka, Milan, to Xerox Corporation. Imaging method. 3,888,670, Cl. 96-27.00R.

Stone, Colwyn Francis: *See*—
Jablonski, Jan; and Stone, Colwyn Francis, 3,888,449.

Stordahl, Calmer M., Jr., to General Motors Corporation. Proportioning valve system for rear braking circuit. 3,888,546, Cl. 303-6.00C.

Stottmann, Richard L., to General Electric Company. Molded plastic flue damper. 3,888,166, Cl. 98-85.000.

Strauss, Kunc Gustav: *See*—
Schmidt, Heinrich Gottlieb; Strauss, Kunc Gustav; and Tennikat, Josef, 3,889,004.

Straza Enterprises Ltd.: *See*—
Straza, George T.; and Parr, Edward L., 3,888,531.

Straza, George T.; and Parr, Edward L., to Straza Enterprises Ltd. Frangible shock absorbing bumper. 3,888,531, Cl. 293-1.000.

Stritt, Franz: *See*—
Vorgrimler, Ludwig; Vorgrimler, Klaus; and Stritt, Franz, 3,888,157.

Stromatt, Robert W.; and Lundquist, Jerry R., to United States of America, Energy Research and Development Administration. Method for electrodeposition of nickel-chromium alloys and coating of uranium. 3,888,744, Cl. 204-1.500.

Strong, Robert Edmund; Boyle, Kenneth; and Grant, John, to British Nuclear Fuels Limited; and United Kingdom Atomic Energy Authority. Glove boxes and similar containments. 3,888,556, Cl. 312-1.000.

Stroud, Edward John: *See*—
Stroud, William Felix, deceased; Stroud, Lois Evelyn, executrix; and Stroud, Edward John, 3,888,150.

Stroud Graphic Equipment Limited: *See*—
Stroud, William Felix, deceased; Stroud, Lois Evelyn, executrix; and Stroud, Edward John, 3,888,150.

Stroud, Lois Evelyn, executrix: *See*—
Stroud, William Felix, deceased; Stroud, Lois Evelyn, executrix; and Stroud, Edward John, 3,888,150.

Stroud, William Felix, deceased; by Stroud, Lois Evelyn, executrix; and Stroud, Edward John, to Stroud Graphic Equipment Limited. Bandsaw book trimmer. 3,888,150, Cl. 83-368.000.

Struthers Scientific: *See*—
Ganiaris, Neophytos, 3,888,423.

Studinger, Hans. Layered absorbant pad material. 3,888,256, Cl. 128-296.000.

Stump, Eugene C., Jr.: *See*—
Schuman, Paul D.; and Stump, Eugene C., Jr., 3,888,854.

Sturgeon, Terence: *See*—
Robertson, Gerald W.; and Sturgeon, Terence, 3,888,086.

Sturzinger, Oskar Edwin. Temperature indicator. 3,888,631, Cl. 23-253.0TP.

Stutz, Erwin; and Brennenstuhl, Hugo. Device for coating objects with pulverized or granular particles or flakes or fibres. 3,888,207, Cl. 118-621.000.

Sugimura, Yoshihiro: *See*—
Yamana, Hirosuke; Kunii, Tadashi; Furusawa, Tomotaka; Sugimura, Yoshihiro; Nakai, Hiroshi; and Hiro, Yasuo, 3,888,826.

Suginuma, Atsushi: *See*—
Oshima, Ryoichiro; Suginuma, Atsushi; Kishi, Atsuo; and Kawashima, Kenichi, 3,888,604.

Sugiyama, Koichi: *See*—
Kishigami, Kunio; Kobayashi, Hiroshi; Sente, Toru; and Sugiyama, Koichi, 3,888,194.

Suh, John T.: *See*—
Schnettler, Richard A.; and Suh, John T., 3,888,860.
Schnettler, Richard A.; and Suh, John T., 3,888,861.

Sulzer Brothers Ltd.: *See*—
Bosshard, Ernst, 3,889,123.

Sumitomo Chemical Co., Ltd.: *See*—
Nakashio, Seizo; Sekine, Noriyuki; Toyota, Nobuhiro; and Fujita, Fumio, 3,888,809.

Sun Electric Corporation: *See*—
Geul, Herman Robert, 3,888,592.

Sun Oil Company: *See*—
Bennett, John D., 3,888,544.

Sun Research and Development Co.: *See*—
Chong, Victor M., 3,888,749.
Thompson, Robert M., 3,888,894.

Sunar Limited: *See*—
Himsl, Ernst G., 3,888,558.

Sunbeam Plastics Corporation: *See*—
Gach, Peter P.; and Montgomery, Gary V., 3,888,373.

Sundt, Cornelius Vickers: *See*—
Nichols, Arnold Douglas; and Sundt, Cornelius Vickers, 3,888,602.

Superior Continental Corporation: *See*—
Simokat, Frank L.; and Greene, Clifford E., 3,889,066.

Survival Technology, Inc.: *See*—
Reinhold, Herbert E., Jr.; and Toren, Richard B., 3,888,240.

Sutherland, Ivan E., to Evans & Sutherland Computer Corporation. System of polygon sorting by dissection. 3,889,107, Cl. 235-152.000.

Sutter, Robert E.; and Mende, David T. Article receiving and collecting receptacle assembly. 3,888,486, Cl. 273-105.00R.

Suvanto, Antti: *See*—
Berglund, Ake; Suvanto, Antti; and Tornblom, Lars, 3,888,732.

Suzuki, Kazuyoshi: *See*—
Ogasawara, Makoto; Suzuki, Kazuyoshi; Urasaki, Takanori; Shima, Takeo; Kurisu, Shizuka; and Hirabayashi, Yasuji, 3,888,938.

Suzuki, Tadao. Muting circuit. 3,889,202, Cl. 330-51.000.

Suzuki, Takeshi; Takenaka, Shigeo; Tanaka, Hiroshi; and Akiyama, Masanori, to Tokyo Shibaura Electric Co., Ltd. Method and apparatus for making electroluminescent screens for color cathode ray tubes. 3,888,673, Cl. 96-36.100.

Suzuki, Takeshi; Tanaka, Hiroshi; Ito, Takeo; and Komatsu, Hiroaki, to Tokyo Shibaura Electric Co., Ltd. Color cathode ray tube with phosphor strips concave toward vertical center line. 3,889,145, Cl. 313-408.000.

Suzuki, Yoshihiro: *See—*
Ishihara, Shinya; and Suzuki, Yoshihiro, 3,889,126.

Svenska Cellulosa Aktiebolaget: *See—*
Andersson, Per-Erik; and Horntvedt, Einar, 3,888,967.

Svensson, Harry. Hinge-like device for caps or covers. 3,888,386, Cl. 220-335.000.

Swails, Rebecca A.: *See—*
Kujawa, Richard J.; and Swails, Rebecca A., 3,888,702.

Swanholm, Carl E.; and Caldwell, Robert G., to Bio-Degradable Plastics, Inc. Photodegradable hydrocarbon polymers. 3,888,804, Cl. 260-2.5HB.

Swift, David William, to Pilkington P-E Limited. Reflection grating optical odometer. 3,888,589, Cl. 356-28.000.

Swithenbank, Colin: *See—*
Bayer, Horst O.; Swithenbank, Colin; and Yih, Roy Y., 3,888,932.

Symmes, Eliot Norman, to Habi-chek Corporation. Means to assist a person in overcoming habits. 3,889,163, Cl. 317-262.00S.

Symon, Ted: *See—*
Christensen, Nils J.; and Symon, Ted, 3,888,883.

Syntex Corporation: *See—*
Fried, John H., 3,888,952.
Katz, Martin; and Neiman, Herbert M., 3,888,995.

Syva Company: *See—*
Leute, Richard K.; and Bolz, Gunner, 3,888,866.

Szabo, Lajos: *See—*
Szantay, Csaba; Szabo, Lajos; Kreidl, Janos; Kalaus, Gyorgy; Keve, Tibor; Turczanyi, Peter; Polgar, Istvan; Farkas nee Kirjak, Maria; and Lakszner, Katalin, 3,888,865.

Szantay, Csaba; Szabo, Lajos; Kreidl, Janos; Kalaus, Gyorgy; Keve, Tibor; Turczanyi, Peter; Polgar, Istvan; Farkas nee Kirjak, Maria; and Lakszner, Katalin, to Richter Gedeon Vgyeszeti Gyzr Rt. Process for the preparation of eburnamonines. 3,888,865, Cl. 260-288.000.

Tabernacki, Harry A., to Kraftco Corporation. Apparatus for shredding. 3,888,428, Cl. 241-92.000.

Tabur, Marcel, to G.M.T. S.A. Machine for performing longitudinal and transverse cuttings in sheets, plates and similar products. 3,888,066, Cl. 53-167.000.

Taddei, Carlo, to Seal Spout Europe S.p.A. Cardboard box conveyor. 3,888,164, Cl. 93-53.00R.

Taguchi, Kazuo; and Satake, Tadashi, to Kabushiki Kaisha Komatsu Seisakusho. Ripper point part. 3,888,637, Cl. 29-191.000.

Taguchi, Tetsuya; Yazaki, Mutsunobu; and Matsuda, Mutsuhide, to Canon Kabushiki Kaisha. Camera incorporating data recording device. 3,889,281, Cl. 354-109.000.

Taguchi, Tetsuya: *See—*
Ogiso, Mitsutoshi; and Taguchi, Tetsuya, 3,889,277.

Takada, Masaki: *See—*
Mizuno, Kimio; Ando, Takuji; Tsujino, Masatoshi; Takada, Masaki; Yoshizawa, Munetoshi; Matsuda, Tetsuo; and Hayashi, Mitsuo, 3,888,843.

Takahara, Kenji: *See—*
Watanabe, Kiyoshi; Hirakawa, Tamotsu; Takahara, Kenji; Nakamura, Yoshio; Iwasaki, Sueo; and Tanaka, Tutomu, 3,888,737.

Takahashi, Susumu: *See—*
Ito, Ryosuke; and Takahashi, Susumu, 3,889,061.

Takahata, Hisatoshi; and Tanikawa, Kohji, to Yashika Co., Ltd. Electric shutter control circuit. 3,889,278, Cl. 354-50.000.

Takamizawa, Kinya; and Iinuma, Kazuhiro, to Tokyo Shibaura Electric Co., Ltd. Ultrasonic wave receiving apparatus. 3,889,227, Cl. 340-6.00R.

Takano, Ikuo; Imajyo, Yasutaka; and Tanimoto, Akira, to Tokyo Shibaura Electric Co., Ltd. Surge voltage absorber. 3,889,222, Cl. 337-244.000.

Takeda Chemical Industries, Ltd.: *See—*
Tatsumi, Testujiro; Miyamoto, Reiji; Matsui, Yutaka; Kazama, Seiji; Takemura, Tadao; and Kanayama, Hikoyoshi, 3,889,031.

Takemoto, Isao: *See—*
Fujii, Masao; Shimatani, Shiro; Orita, Ryoji; and Takemoto, Isao, 3,888,575.

Takemura, Tadao: *See—*
Tatsumi, Testujiro; Miyamoto, Reiji; Matsui, Yutaka; Kazama, Seiji; Takemura, Tadao; and Kanayama, Hikoyoshi, 3,889,031.

Takenaga, Mutsuo: *See—*
Yamamoto, Osamu; Takenaga, Mutsuo; and Tsujimoto, Yoshinobu, 3,889,124.

Takenaka, Shigeo: *See—*
Suzuki, Takeshi; Takenaka, Shigeo; Tanaka, Hiroshi; and Akiyama, Masanori, 3,888,673.

Tamai, Vasuo: *See—*
Matsumoto, Seiji; and Tamai, Vasuo, 3,888,666.

Tamura, Hifumi; and Kondo, Toshio, to Hitachi, Ltd. Ion microanalyzer. 3,889,115, Cl. 250-307.000.

Tanaka, Hideki; Ishida, Kazutaka; Watanabe, Mikio; Inouchi, Mitsuhiro; Yoshioka, Shigeru; Handa, Minoru; and Kitabatake, Asao, to Furuno Electric Company, Limited. Station distinguishing system in omega receiver. 3,889,265, Cl. 343-105.00R.

Tanaka, Hiroshi; Soma, Ikuo; Ito, Yoshikazu; and Kamijo, Masayasu, to Canon Kabushiki Kaisha. Transferring paper for electrophotography. 3,889,033, Cl. 428-323.000.

Tanaka, Hiroshi: *See—*
Suzuki, Takeshi; Takenaka, Shigeo; Tanaka, Hiroshi; and Akiyama, Masanori, 3,888,673.
Suzuki, Takeshi; Tanaka, Hiroshi; Ito, Takeo; and Komatsu, Hiroaki, 3,889,145.

Tanaka, Minoru: *See—*
Teshima, Toru; Nagasao, Toshiie; Tanaka, Minoru; Ariga, Kazuo; and Inoue, Kiyoshi, 3,888,756.

Tanaka, Susumu; Enoguchi, Yuji; and Kawabata, Hidetoshi, to Minolta Camera Kabushiki Kaisha. Toner dispensing device. 3,888,394, Cl. 222-230.000.

Tanaka, Tsuyoshi; and Ninomiya, Hisakazu, to Hitachi, Ltd. Device for controlling speed of three-phase induction motor. 3,889,167, Cl. 318-227.000.

Tanaka, Tutomu: *See—*
Watanabe, Kiyoshi; Hirakawa, Tamotsu; Takahara, Kenji; Nakamura, Yoshio; Iwasaki, Sueo; and Tanaka, Tutomu, 3,888,737.

Tanczyn, Harry, to Armco Steel Corporation. Process for cold-working and stress-relieving non-heat hardenable ferritic stainless steels. 3,888,119, Cl. 72-364.000.

Tanigawa, Tuneo: *See—*
Fujiwhara, Mitsuto; Kasai, Keiji; Satoh, Ryosuke; Nakagawa, Yoshinobu; and Tanigawa, Tuneo, 3,888,680.

Tanikawa, Kohji: *See—*
Takahata, Hisatoshi; and Tanikawa, Kohji, 3,889,278.

Tanimoto, Akira: *See—*
Takano, Ikuo; Imajyo, Yasutaka; and Tanimoto, Akira, 3,889,222.

Tarneja, Krishan S.; and Bartko, John, to Westinghouse Electric Corporation. Tailoring reverse recovery time and forward voltage drop characteristics of a diode by irradiation and annealing. 3,888,701, Cl. 148-1.500.

Tartaglia, Ralph W., to Rockwell International Corporation. Bidirectional pressure balanced valve. 3,888,280, Cl. 137-630.130.

Tate, John F. P. Spacing tool. 3,888,477, Cl. 269-82.000.

Tatemichi, Hidemaro: *See—*
Ogasawara, Takahisa; Senzaki, Yoshimichi; Kato, Hiroyuki; and Tatemichi, Hidemaro, 3,888,830.

Tatsumi, Testujiro; Miyamoto, Reiji; Matsui, Yutaka; Kazama, Seiji; Takemura, Tadao; and Kanayama, Hikoyoshi, to Takeda Chemical Industries, Ltd.; and Mitsui Polychemicals, Co., Ltd. Coated glass bottles. 3,889,031, Cl. 428-216.000.

Tatyrek, Alfred F.; and Werbel, Burton, to United States of America, Army. Inorganic salts as inhibitors for tetrakisdimethylamino ethylene-water chemical interaction. 3,888,785, Cl. 252-188.3CL.

Taylor, Carol O.: *See—*
Whicker, Stephen L.; and Taylor, Carol O., 3,889,119.

Taylor, Joseph W. High or low pressure control device. 3,888,457, Cl. 251-14.000.

Teass, Horace A., Jr. Conductivity measuring circuit. 3,889,183, Cl. 324-30.00R.

Technar Incorporated: *See—*
Bell, Lon E., 3,889,232.

Techniques et Systemes Informatiques: *See—*
Battarel, Claude, 3,889,246.

Technology Service Corporation: *See—*
Reed, Irving S.; and Obenchain, Irving R., Jr., 3,889,067.

Teijin Limited: *See—*
Fujita, Yutaka; Naruchi, Tatsuyuki; and Yoshisato, Eishin, 3,888,845.
Koizumi, Yukimichi; Kobayashi, Yoshihiro; Murase, Yasuhiro; and Kondo, Takamitsu, 3,888,775.
Ogasawara, Makoto; Suzuki, Kazuyoshi; Urasaki, Takanori; Shima, Takeo; Kurisu, Shizuka; and Hirabayashi, Yasuji, 3,888,938.
Yamamoto, Kiyoshi; and Yamashita, Gentaro, 3,888,921.

Telang, Yeshwant P.: *See—*
Uy, James C.; and Telang, Yeshwant P., 3,888,746.

Teldix GmbH: *See—*
Leiber, Heinz, 3,888,328.
Wehde, Heinz, 3,888,553.

Teledyne Electro-Mechanisms: *See—*
Hastings, Myron L.; and Roberts, Joseph P., 3,888,639.

Telephonic Equipment Company: *See—*
Oatis, Melvin Neal; and McNulty, Henry V., 3,889,070.

Telfer, Thomas A.: *See—*
United States of America, National Aeronautics and Space Administration; and Telfer, Thomas A., 3,889,122.

Temple, Ernest E., to Mine Safety Appliances Company. Explosively actuated separable connecting device. 3,888,158, Cl. 89-1.00B.

Templeton, William E. Rotary lawn mower. 3,888,072, Cl. 56-320.200.

Tennikat, Josef: *See—*
Schmidt, Heinrich Gottlieb; Strauss, Kunc Gustav; and Tennikat, Josef, 3,889,004.

Terui, Yukimasa: *See—*
Akiyoshi, Katsumi; Terui, Yukimasa; Kirigaya, Hitoshi; and Koyama, Haruo, 3,888,712.

Terwilliger, James P.; Gingello, Anthony D.; and Tinney, John R., to Eastman Kodak Company. Apparatus for combining chemically compatible solutions. 3,888,465, Cl. 259-4.000.

Teshima, Toru; Nagasao, Toshiie; Tanaka, Minoru; Ariga, Kazuo; and Inoue, Kiyoshi, to Stanley Denki Kabushiki Kaisha; and Kabushiki Kaisha Inoue Japax Kenkyusho. Apparatus for treating water containing impurities. 3,888,756, Cl. 204-275.000.

Texaco Inc.: *See—*
Child, Edward T.; and Robin, Allen M., 3,888,043.
Schievelbein, Vernon H.; and Sample, Thomas E., Jr., 3,888,310.

Texas Instruments Incorporated: *See—*
Elshuber, Karl, 3,889,195.
Gosney, William Milton, Jr., 3,889,245.
Holmes, Jerry D.; and Moore, Samuel D., 3,889,258.
Klusmann, Donald L.; Soh, Jin Y.; and Whitaker, Roger B., 3,889,173.
Nygaard, James L., 3,888,674.
Schwartz, Robert J., 3,888,115.
Whicker, Stephen L.; and Taylor, Carol O., 3,889,119.

Textron Inc.: *See—*
Flachbarth, Charles T.; and Myers, John L., 3,889,044.
Reese, Gerald D.; Shank, Gerald G.; and Carlson, Lowell D., 3,888,214.

TH Goldschmidt AG: *See—*
Petrik, Bruno; and Ruf, Erich, 3,888,728.

Theodore, Ares N.: *See—*
Labana, Santokh S.; and Theodore, Ares N., 3,888,943.

Thettu, Raghulinga R., to Xerox Corporation. Temperature sensing device. 3,888,622, Cl. 432-36.000.

Thiokol Corporation: *See—*
McCullough, Edward E.; and Anderson, E. Eugene, 3,888,419.

Thomas, Robert W.: *See—*
Lighthall, John T.; and Thomas, Robert W., 3,889,198.

Thompson, James Lawrence Earl; Clarke, Wallace Eugene; and Gale, James, to Northern Electric Company Limited. Loudspeaking communication terminal apparatus and method of operation. 3,889,059, Cl. 179-1.00P.

Thompson, Robert M., to Sun Research and Development Co. Tertiary diamides. 3,888,894, Cl. 260-404.500.

Thompson, Wallace T., to GTE Sylvania Incorporated. Subscription television system and switching station therefor. 3,889,050, Cl. 178-5.100.

Thomson-CSF: *See—*
Sirven, Jacques, 3,889,261.

Thouret, Wolfgang E.; and Kaufman, Rudolph, to Duro-Test Corporation. Vibrating filament lamp with auxiliary stationary filament. 3,889,154, Cl. 315-267.000.

Ticknor, Raymond G.: *See—*
Rodek, Victor; and Ticknor, Raymond G., 3,888,579.

Tiefenau, Helmut Karl Ernst, to Max-Planck-Gesellschaft ZUR Forderung der Wissenschaften e.V. Ozone measuring cell. 3,888,754, Cl. 204-195.00R.

Tiernan, Stanley C.; and Berry, Ronald, to Rockwell International Corporation. Loom harness mechanism. 3,888,284, Cl. 139-82.000.

Tijunelis, Donatas: *See—*
Legg, Leo V.; and Tijunelis, Donatas, 3,889,049.

Tilman, Milton M.; Crosby, Robert L.; and Neumeier, Leander A., to United States of America, Interior. Method of producing creep resistance of Pb-Sb alloys. 3,888,703, Cl. 148-11.50R.

Timesavers, Inc.: *See—*
Elm, Donald C., 3,888,050.

Tiner, Robert L.; Holtmyer, Marlin D.; King, Bobby J.; and Gatlin, Richard A., to Halliburton Company. Method and compositions for fracturing well formations. 3,888,312, Cl. 166-308.000.

Tinney, John R.: *See—*
Terwilliger, James P.; Gingello, Anthony D.; and Tinney, John R., 3,888,465.

Toagosei Chemical Industrial Co., Ltd.: *See—*
Ogasawara, Takahisa; Senzaki, Yoshimichi; Kato, Hiroyuki; and Tatemichi, Hidemaro, 3,888,830.

Toews, Leonard F., to Kennametal Inc. Arrangement for enhancing blade life. 3,888,027, Cl. 37-141.00R.

Tokyo Shibaura Electric Co., Ltd.: *See—*
Ishikawa, Teruo, 3,889,091.
Suzuki, Takeshi; Takenaka, Shigeo; Tanaka, Hiroshi; and Akiyama, Masanori, 3,888,673.
Suzuki, Takeshi; Tanaka, Hiroshi; Ito, Takeo; and Komatsu, Hiroaki, 3,889,145.
Takamizawa, Kinya; and Iinuma, Kazuhiro, 3,889,227.
Takano, Ikuo; Imajyo, Yasutaka; and Tanimoto, Akira, 3,889,222.

Toledo Stamping & Manufacturing Company: *See—*
Grau, Theodore H., 3,888,390.

Tomalia, Donald A.; and Giacobbe, Thomas J., to Dow Chemical Company, The. Aziridinyl haloformimides. 3,888,847, Cl. 260-239.00E.

Tomenceak, Arthur A., to Bullard Company, The. Contour machining. 3,888,146, Cl. 82-1.00C.

Tomita, Tsutomu, to Toyota Jidosha Kogyo Kabushiki Kaisha. Exhaust gas recirculation. 3,888,222, Cl. 123-119.00A.

Tomlin, Allen J. Operation actuated ignition-kill device. 3,889,089, Cl. 200-334.000.

Tomorrow Enterprises, Inc.: *See—*
Bagwell, Dennis P., 3,888,005.

Tone, John W. Variable speed dual hydrostatic drive. 3,888,083, Cl. 60-431.000.

Tonka Corporation: *See—*
Waterhouse, Harlan L., 3,888,040.

Topp Electronics, Inc.: *See—*
Wecker, Leon S., 3,888,075.

Topp, Ronald L.: *See—*
Villani, Vincent; and Topp, Ronald L., 3,888,691.

Toppan Printing Co., Ltd.: *See—*
Watanabe, Masanori, 3,888,163.

Toren, Richard B.: *See—*
Reinhold, Herbert E., Jr.; and Toren, Richard B., 3,888,240.

Toriyama, Kazuhisa; Nakano, Fumio; Sato, Mikio; Abe, Hidetoshi; and Kanazaki, Mikio, to Hitachi, Ltd. Electro-optical device including an improved liquid crystal composition. 3,888,566, Cl. 350-160.0LC.

Tornblom, Lars: *See—*
Berglund, Ake; Suvanto, Antti; and Tornblom, Lars, 3,888,732.

Torpie, John David: *See—*
Perreault, Donald A.; Bedzyk, Victor Lee; Matthews, Larry Richard; Rivers, Roy Wilben; Shuey, David Rolling; and Torpie, John David, 3,889,057.

Torrington, Leslie Albert; and Stave, Frederick Roland, to RCA Corporation. Apparatus for inhibiting a plurality of records from being disposed on a turntable. 3,888,493, Cl. 274-1.00R.

Tosato, Lawrence; Abel, Leon A.; and Mullis, Clyde M., to Westinghouse Electric Corporation. Elevator signalling system. 3,889,231, Cl. 340-21.000.

Tosca, Alessandro. Pivotable modular hygienic-sanitary system. 3,887,947, Cl. 4-2.000.

Totten, Ralph P.; and Lewis, Gerald F. Ice fishing rod. 3,888,035, Cl. 43-17.000.

Touval, Irving; and Dunkel, Morris, to Universal Oil Products Company. Novel flame retardant compositions of matter. 3,888,820, Cl. 260-45.70R.

Townsend, Margaret E.: *See—*
Whetzel, Lawrence C.; and Townsend, Margaret E., 3,888,739.

Toyama, James. Steam dust scrubber attachment for exhaust stack. 3,888,642, Cl. 55-263.000.

Toyo Jozo Kabushiki Kaisha: *See—*
Hamakawa, Hiroshi; Kobari, Sadami; Shimizu, Takeshi; Fujimoto, Kentaro; Hayano, Kazuo; and Matsuda, Tetsuo, 3,888,927.
Mizuno, Kimio; Ando, Takuji; Tsujino, Masatoshi; Takada, Masaki; Yoshizawa, Munetoshi; Matsuda, Tetsuo; and Hayashi, Mitsuo, 3,888,843.

Toyoda-Koki Kabushiki Kaisha: *See—*
Sakurai, Itaru, 3,889,238.

Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Kizu, Ryohei; Muramatu, Tadao; and Kobayasi, Teruo, 3,888,508.
Nohira, Hidetaka, 3,888,080.
Tomita, Tsutomu, 3,888,222.

Toyota, Nobuhiro: *See—*
Nakashio, Seizo; Sekine, Noriyuki; Toyota, Nobuhiro; and Fujita, Fumio, 3,888,809.

Trabanino, Humberto. Landing gear position simulator. 3,888,019, Cl. 35-12.00B.

Tracey, Donald John, Jr.: *See—*
Haacke, Gottfried Christian; and Tracey, Donald John, Jr., 3,888,565.

Traunecker, Werner: *See—*
Koppe, Herbert; Stahle, Helmut; Kummer, Werner; Muacevic, Gojko; and Traunecker, Werner, 3,888,898.

Trautvetter, Werner: *See—*
Pinten, Peter; Naubereit, Hans; and Trautvetter, Werner, 3,888,948.

Treadaway, Frank G., to Harsco Corporation. Means for forming a seal about a conduit. 3,888,454, Cl. 249-90.000.

Tri-M Tool Corporation: *See—*
Maxwell, Richard D., 3,888,320.

Tri-Matic, Inc.: *See—*
Purtell, Rufus J., 3,888,281.

Triangle Biomedical Equipment, Inc.: *See—*
Kinney, Thomas D.; and Pickett, John E. P., 3,889,014.

Trindade, David Charles, to International Business Machines Corporation. Time zero determination of FET reliability. 3,889,188, Cl. 324-158.00T.

Triumph Werke Nuernberg A.G.: *See—*
Eder, Hans; Meier, Heinz; and Richter, Arend, 3,888,479.

Triumph Werke Nurnberg A. G.: *See—*
Nowak, Gerald; and Decker, Herbert, 3,888,339.

Tropel, Inc.: *See—*
Munnerly, Charles R.; Obinson, Bruce R.; and Horwitz, James W., 3,888,569.

Troster, Helmut, to Hoechst Aktiengesellschaft. Benzoxanthene and benzothioxanthene dyestuffs and process for their manufacture. 3,888,863, Cl. 260-281.000.

Troster, Helmut: *See—*
Deucker, Walter; and Troster, Helmut, 3,888,885.

Trujillo, Patricio E.: *See—*
Campbell, Evan E.; Eutsler, Bernard C.; and Trujillo, Patricio E., 3,888,124.

Trush, Steven F. Electronic control system. 3,889,161, Cl. 317-148.50B.

TRW Inc.: *See—*
Basham, Jack K., 3,889,134.

Tsen, Lo Kwang, to General Electric Company. Resinous compositions and laminates made therefrom. 3,888,942, Cl. 260-830.0TW.

Tseng, Chien K.: *See—*
Pallos, Ferenc M.; and Tseng, Chien K., 3,888,987.

Tsujimoto, Yoshinobu: *See—*
Yamamoto, Osamu; Takenaga, Mutsuo; and Tsujimoto, Yoshinobu, 3,889,124.

Tsujino, Masatoshi: *See—*
Mizuno, Kimio; Ando, Takuji; Tsujino, Masatoshi; Takada, Masaki; Yoshizawa, Munetoshi; Matsuda, Tetsuo; and Hayashi, Mitsuo, 3,888,843.

Tsumita, Toru; and Kuwabara, Seishi, to Mitsui Pharmaceuticals, Incorporated. Tuberculin active proteins and peptides from the cells of tubercle bacilli. 3,888,837, Cl. 260-112.500.
Tsuno, Tomoaki: *See—*
Kawamoto, Kensuke; Tsuno, Tomoaki; and Namiki, Teruo, 3,888,969.
Tsushima, Yakichi, to Nisshin Tsushima Co., Ltd.; and Iwatani & Co., Ltd., a part interest to each. Scaffolding for supporting fresh concrete floor slabs. 3,888,447, Cl. 248-235.000.
Tucci, Raymond J.: *See—*
Mlkvy, William P.; and Tucci, Raymond J., 3,888,976.
Tucker, Donald Spencer. Programmable projection system. 3,888,780, Cl. 352-92.000.
Turczanyi, Peter: *See—*
Szantay, Csaba; Szabo, Lajos; Kreidl, Janos; Kalaus, Gyorgy; Keve, Tibor; Turczanyi, Peter; Polgar, Istvan; Farkas nee Kirjak, Maria; and Lakszner, Katalin, 3,888,865.
Turro, Eugene J.; and Sipos, Endre F., to Central Soya Company, Inc. Bakery formulation containing non-fat dry milk substitute. 3,888,996, Cl. 426-62.000.
Tuttle, Thomas J., to Rockwell International Corporation. Conduit hanger assembly for automotive and similar uses. 3,888,439, Cl. 248-54.00R.
Tyagi, Ramesh C.: *See—*
United States of America, National Aeronautics and Space Administration; Tyagi, Ramesh C.; Debnam, William J., Jr.; McNear, Maxwell F.; Crouch, Roger K.; and Breckenridge, Roger A., 3,888,705.
Tyau, Walter Fah Min, to International Telephone and Telegraph Corporation. Trigger circuit for ball prover or the like. 3,889,200, Cl. 328-163.000.
Tyroler, Jesse F., to United States of America, Army. Flare system. 3,888,177, Cl. 102-31.000.
Uddeholms Aktiebolag: *See—*
Klint, Nils J., 3,888,956.
Uekama, Kaneto: *See—*
Higuchi, Takeru; and Uekama, Kaneto, 3,888,848.
Uematsu, Shinichi: *See—*
Isuge, Masami; Uematsu, Shinichi; Ono, Yotsuo; Eiga, Shokichi; and Makita, Minoru, 3,888,771.
Uhrig, Heinz: *See—*
Grossmann, Max; Faber, Ruth; and Uhrig, Heinz, 3,888,828.
Ulion, Nicholas E.: *See—*
Blecherman, Sol S.; Bala, Mitchell J.; Evans, Dennis J.; and Ulion, Nicholas E., 3,889,019.
Ulmschneider, Lawrence A.; and Dowling, Edward H., to Eastman Kodak Company. Injection molding apparatus. 3,888,615, Cl. 425-246.000.
Ulmschneider, Lawrence A.; and Dowling, Edward H., to Eastman Kodak Company. Injection molding apparatus. 3,888,616, Cl. 425-246.000.
Ulmschneider, Lawrence A.; and Dowling, Edward H., to Eastman Kodak Company. Injection molding apparatus. 3,888,619, Cl. 425-436.00R.
Ulysses Stanley Ames: *See—*
Ames, Robert G., 3,888,611.
Umstead, William E. Combination tie end latch and reinforcing timber clamp. 3,888,456, Cl. 249-219.00W.
Uni-Mist, Inc.: *See—*
Boelkins, Wallace G., 3,888,420.
Unimation, Inc.: *See—*
Becker, John L.; Hohnecker, Otto; and Dunne, Maurice J., 3,888,361.
Union Carbide Corporation: *See—*
Urry, Lewis F., 3,888,699.
Uniroyal, Inc.: *See—*
De Young, Wayne J., 3,888,766.
Geyer, Paul, 3,888,469.
Habert, William C., 3,888,720.
Hunter, Byron A.; and Barrows, Franklin H., 3,888,801.
Hunter, Byron A., 3,888,802.
Pande, Gyan S.; and Balatoni, Julius A., 3,888,878.
Robertson, Gerald W.; and Sturgeon, Terence, 3,888,086.
Weaver, Ebon Paul, 3,888,941.
Unistrut Corporation: *See—*
Rebentisch, Hugo E., 3,888,440.
Rebentisch, Hugo E., 3,888,441.
United Aircraft Corporation: *See—*
Blecherman, Sol S.; Bala, Mitchell J.; Evans, Dennis J.; and Ulion, Nicholas E., 3,889,019.
Hayes, Douglas R., 3,888,301.
Nichols, Arnold Douglas; and Sundt, Cornelius Vickers, 3,888,602.
Worthen, Eugene P., deceased; and New England Merchant Natl. Bank, executor, 3,888,337.
United Kingdom Atomic Energy Authority: *See—*
Allen, William Douglas; and Morris, Michael, 3,889,138.
Jackson, George Oliver, 3,888,730.
Strong, Robert Edmund; Boyle, Kenneth; and Grant, John, 3,888,556.
United States of America
America: *See—*
Cericola, Robert F., 3,888,475.
Army: *See—*
Durenec, Peter, 3,888,536.
Dusoe, George D.; and Messineo, Joseph R., 3,888,175.
Greer, Charles B., 3,889,181.
Gutleber, Frank S., 3,889,199.
Kups, Edward F., 3,888,181.
Larson, Robin J., 3,889,186.
Levitt, Albert P.; and Di Cesare, Eugene, 3,888,661.
Nord, Kermit; and Wallenhorst, Francis C., 3,888,179.
Pardes, Herman I.; Schwartz, Joseph R.; and Sherburne, Frederick B., 3,888,022.
Schiel, Ernst J., 3,889,284.
Szczerzenie, Francis E.; and Zaleski, Frank I., 3,888,636.
Tatyrek, Alfred F.; and Werbel, Burton, 3,888,785.
Tyroler, Jesse F., 3,888,177.
Energy Research and Development Administration: *See—*
Campbell, Evan E.; Eutsler, Bernard C.; and Trujillo, Patricio E., 3,888,124.
Finch, Lester M.; and Anthony, Andy J., 3,888,731.
Grimmett, Earl S.; and Kunze, Jay F., 3,888,733.
Stromatt, Robert W.; and Lundquist, Jerry R., 3,888,744.
General Counsel-Code GP: *See—*
Easley, Wesley C.; White, William F.; and Wingfield, George A., 3,889,182.
McKee, Charles W., 3,888,410.
United States of America, National Aeronautics and Space Administration; and Hansen, George R., Jr., 3,889,264.
Wojtasinski, Ronald J.; Jones, James H.; and Lisle, Raymond V., 3,889,185.
Interior: *See—*
Haas, Larry A.; Khalafalla, Sanaa E.; and McCormick, Thomas H., 3,888,970.
Tilman, Milton M.; Crosby, Robert L.; and Neumeier, Leander A., 3,888,703.
National Aeronautics and Space Administration; administrator; with respect to an invention of:
Anderson, Tage O. Asynchronous, multiplexing, single line transmission and recovery data system. 3,889,064, Cl. 179-15.0BS.
Hansen, George R., Jr., to United States of America, General Counsel-Code GP. Vehicle locating system utilizing AM broadcasting station carriers. 3,889,264, Cl. 343-105.00R.
Telfer, Thomas A. Method of determining bond quality of power transistors attached to substrates. 3,889,122, Cl. 250-359.000.
Tyagi, Ramesh C.; Debnam, William J., Jr.; McNear, Maxwell F.; Crouch, Roger K.; and Breckenridge, Roger A. Vapor phase growth of groups III-V compounds by hydrogen chloride transport of the elements. 3,888,705, Cl. 148-175.000.
National Aeronautics and Space Administration; deputy administrator; with respect to an invention of:
Johnston, Alan R. Cooperative multiaxis sensor for teleoperation of article manipulating apparatus. 3,888,362, Cl. 214-1.00B.
National Aeronautics and Space Administration: *See—*
Klingman, Edwin E., III, 3,889,155.
Kurtz, Robert L., 3,888,561.
Navy: *See—*
Alsup, James M., 3,889,065.
Black, Harold D., 3,888,122.
Cantrell, Ben H., 3,889,108.
Cooper, Michael T., 3,888,089.
Dillard, George M., 3,889,257.
Koff, Irwin; and Finnegan, William G., 3,888,415.
Muraco, Paul F.; and Griffin, James S., 3,889,293.
Nooker, Eugene L., 3,888,180.
Panella, Edward A., 3,887,991.
Peters, Carl I., 3,889,268.
Reed, Edgar A.; and Combos, E. Russell, 3,889,224.
Rothenstein, Julius, 3,888,707.
Vittoria, Carmine; Pasternak, Joseph; and Lessoff, Howard, 3,889,213.
West, Edward J.; and Giallorenzi, Thomas G., 3,888,648.
Winslow, Lester M.; and Brown, Hazel E., 3,889,149.
U.S. Philips Corporation: *See—*
Asselman, George Albert Apolonia; and Dirne, Adrianus Petrus, 3,889,096.
De Leeuw, Paul; and Kruishoop, Johan Christiaan Willem, 3,888,112.
Gowers, Jonathan Paul, 3,889,143.
Herger, Horst; and Schulz, Helmut Hasso, 3,889,236.
Jan van Oostrum, Karel, 3,889,114.
Kay, Malcolm John, 3,889,137.
Lucas, David Adrian; and Vincent, Richard Paul, 3,889,267.
Mitchell, Richard Frank, 3,889,205.
Sharp, Denis, 3,888,548.
Steinmetz, Anthony; and Walstra, Hidde, 3,889,098.
Willems, Antonius Gerhardus Maria, 3,888,857.
Unitrol Water Saving Products Ltd.: *See—*
Bron, Dan, 3,888,461.
Universal Oil Products Company: *See—*
Christensen, Nils J.; and Symon, Ted, 3,888,883.
Dombro, Robert A.; Illingworth, George E.; and Fronczak, Richard A., 3,888,789.
Fickel, R. Gene, 3,888,743.
Geiser, Edward M., 3,888,690.
Gerhold, Clarence G., 3,888,762.
Greenwood, Arthur R., 3,888,764.
Lacey, Robert R., 3,888,451.
Rosback, Donald H., 3,888,939.

Sobel, Jay E., 3,888,935.
Touval, Irving; and Dunkel, Morris, 3,888,820.
Wilhelm, Frederick C., 3,888,763.

Upjohn Company, The: *See—*
Lednicer, Daniel; and Nishizawa, Edward E., 3,888,833.
Pike, John E.; and Schneider, William P., 3,888,919.
Schneider, William P., 3,888,904.
Sinkula, Anthony A., 3,888,916.

Urasaki, Takanori: *See—*
Ogasawara, Makoto; Suzuki, Kazuyoshi; Urasaki, Takanori; Shima, Takeo; Kurisu, Shizuka; and Hirabayashi, Yasuji, 3,888,938.

Urry, Lewis F., to Union Carbide Corporation. Primary dry cell. 3,888,699, Cl. 136-107.000.

Urschel, Joe R.; and Sanders, Edgar R. Machine and method for comminuting products. 3,888,426, Cl. 241-5.000.

Uy, James C., to Ford Motor Company. Rotary internal combustion engine. 3,888,606, Cl. 418-179.000.

Uy, James C.; and Telang, Yeshwant P., to Ford Motor Company. Method of providing an intermediate steel layer for chrome plating on rotor housings. 3,888,746, Cl. 204-36.000.

Valenza, Andre: *See—*
Courbat, Pierre; and Valenza, Andre, 3,888,990.

Valinor Anstalt: *See—*
Bornand, Robert M., 3,888,031.

Valmont Industries Inc.: *See—*
O'Brien, Dennis H.; and Havranek, Dennis D., 3,888,446.

Van Coney, Robert H., to Procter & Gamble Company, The. Aerosol package nozzle having means for reducing product retention therein and valve actuator. 3,888,392, Cl. 222-108.000.

van den Berg, Heinz, to Dynamit Nobel Aktiengesellschaft. Multiple-layered, weldable padded element. 3,889,037, Cl. 428-302.000.

Vandenbossche, Benjamin Edward, to Fafco Incorporated. Solar heater panel array securing apparatus. 3,887,967, Cl. 24-73.0PB.

Van Dyke Tiers, George: *See—*
Smith, Carl Mayn; and Van Dyke Tiers, George, 3,888,891.

Van Gils, Gerard E.; and Kalafus, Edward F., to General Tire & Rubber Company, The. Method for bonding polyamides to rubber, adhesive for the same, and adhesive coated polyamide reinforcing elements. 3,888,805, Cl. 260-5.000.

Van Moss, John H., Jr. Dampened axle bearing mounting. 3,888,187, Cl. 105-224.100.

Van Moss, John H., Jr. Elastomeric railway car side bearing. 3,888,555, Cl. 308-138.000.

Van Norman, Gilden R.: *See—*
Bailey, William J., Jr.; Houle, James F.; and Van Norman, Gilden R., 3,888,678.

Van Winkle, Howard E.: *See—*
Hirschman, Joel A.; and Van Winkle, Howard E., 3,889,169.

Vaponics, Inc.: *See—*
Smith, Verity C.; and Reynolds, Lawrence H., 3,888,519.

Vaughan, Harry L., to Scripto, Inc. Unitary resilient sealing valve. 3,888,286, Cl. 141-291.000.

Vaughn, Lawrence G.: *See—*
Kirchner, Jack R.; and Vaughn, Lawrence G., 3,888,890.

VCA Corporation: *See—*
Gerk, Richard G., 3,888,375.
Gerk, Richard G., 3,888,378.

Veb Pentalon Dresden: *See—*
Reimann, Herbertus; and Clauss, Gunter, 3,888,365.

Veber, Daniel F.; and Brady, Stephen F., to Merck & Co., Inc. Pentapeptide intermediate of LHRH and derivatives thereof. 3,888,836, Cl. 260-112.500.

Veco Zeefplatenfabriek B.V.: *See—*
Bolk, Fredrik Willem, 3,888,765.

Velan, George Michael; and Peabody, Glenn Robert, to Illinois Tool Works Inc. Sheet acceleration and synchronization mechanism. 3,888,129, Cl. 74-29.000.

Velsicol Chemical Corporation: *See—*
Richter, Sidney B.; and Krenzer, John, 3,888,882.

Venkataramaiah, Amaraneni: *See—*
Gunter, Gordon; and Venkataramaiah, Amaraneni, 3,889,007.

Vereinigte Osterreichische Eisen- und Stahlwerke - Alpine Montan Aktiengesellschaft: *See—*
Fastner, Thorwald; Niedermayr, Alois; and Bachner, Ernst, 3,888,294.

Vereinigte Schmirgel-und Maschinenfabriken AG: *See—*
Bigorajski, Gunter; and Ellerkamp, Joachim, 3,888,640.

Verge, John Pomfret: *See—*
Hughes, Peter Graham; and Verge, John Pomfret, 3,888,984.

Vernia, Peter; and Holzwarth, James C., to General Motors Corporation. Method for the manufacture of a composite article. 3,888,296, Cl. 164-97.000.

Vetter, Hans: *See—*
Meyer, Rudolf; Hoffmann, Klaus; Freytag, Karl-Heinz; and Vetter, Hans, 3,889,269.

Victor Company of Japan, Ltd.: *See—*
Katoh, Hiroshi, 3,888,432.

Victor Comptometer Corporation: *See—*
Fischer, Earl L., 3,888,229.

Victor Plastics, Inc.: *See—*
Bonewitz, Everett D., 3,888,218.

Villani, Vincent; and Topp, Ronald L., to Lockheed Aircraft Corporation. Porous ceramic. 3,888,691, Cl. 106-40.00V.

Vincent, Richard Paul: *See—*
Lucas, David Adrian; and Vincent, Richard Paul, 3,889,267.

Vitticore, Julius M.; and Mooney, David N., to Parker-Hannifin Corporation. Article having a sight glass and method of making the same. 3,888,205, Cl. 116-117.00C.

Vittoria, Carmine; Pasternak, Joseph; and Lessoff, Howard, to United States of America, Navy. Double-cavity microwave filter. 3,889,213, Cl. 333-73.00W.

Vivian, James R.: *See—*
Pilz, Gilbert B.; and Vivian, James R., 3,888,513.

Vlasenko, Natalya Andreevna; Gergel, Alla Nikolaevna; and Shkola, Andrei Antonovich. Method of making a direct current electroluminescent device. 3,889,016, Cl. 428-66.000.

Volkswagenwerk Aktiengesellschaft: *See—*
Bigalke, Erhard; Radmann, Dietrich; Klein, Erwin; Melichar, Rainer; and Biedermann, Kurt, 3,888,220.
Deiss, Hans-Dieter; Spengler, Erich; and Georges, Gerard, 3,889,273.
Protze, Dieter; and Bauer, Andreas, 3,888,540.

Voll, Walter. Device for detecting the presence of liquids. 3,889,247, Cl. 340-244.00C.

von Tell Trading Co. AB: *See—*
Jericijo, Boris, 3,888,528.

Von Berckheim, Constantin Graf. Arrangement for the generation of unipolar air ions. 3,889,157, Cl. 317-4.000.

Voorhees, John E.: *See—*
Fortman, Ronald F.; and Voorhees, John E., 3,888,097.

Vorgrimler, Klaus: *See—*
Vorgrimler, Ludwig; Vorgrimler, Klaus; and Stritt, Franz, 3,888,157.

Vorgrimler, Ludwig; Vorgrimler, Klaus; and Stritt, Franz, to Industrie-Werke Karlsruhe Augsburg. Circuit arrangement for weapons used in arming airplanes, particularly turret guns. 3,888,157, Cl. 89-1.00K.

Vrcelj, Mihailo J.: *See—*
Colwell, Robert E.; Liegois, William A.; Wilks, Gerald W.; and Vrcelj, Mihailo J., 3,888,973.

Vreeland, Robert L. Timer assembly for outside light. 3,889,132, Cl. 307-141.000.

Vulcan Engineering Company: *See—*
Gregord, Thomas; Filipich, Bernard; and Jancosko, William, 3,888,062.

Vural, Gulertan, to Koehring GmbH - Bomag Division. Variable mass oscillation exciter. 3,888,600, Cl. 404-117.000.

W. F. Larson, Inc.: *See—*
Wallace, Louie E., 3,888,071.

W. R. Grace & Co.: *See—*
Gribens, Joel A.; and Cogliano, Gregory P., 3,888,380.

W. S. Shamban & Co.: *See—*
Dryer, Eldon O., 3,888,496.

Wachsman, William P. Bed structure affording displacement for housekeeping and making. 3,887,950, Cl. 5-11.000.

Wagenknecht, Benno August; and Breckle, Horst Erich, to Bunker Ramo Corporation. Apparatus for clock. 3,888,074, Cl. 58-23.00R.

Wagner, Josef; and Grill, Helmut, to Chemisch-Pharmazeutische Fabrik Adolf Klinge & Co. Choleretic medicine. 3,888,994, Cl. 424-342.000.

Wainer, Eugene, to Horizons Incorporated. Nucleation and orientation of linear polymers. 3,889,039, Cl. 428-404.000.

Waldes Kohinoor, Inc.: *See—*
Coch, Lester, 3,888,471.

Walding, Wayne A.: *See—*
Arrandale, Roy S.; Walding, Wayne A.; and Daugherty, Barney R., 3,889,030.

Walker, Edward J., to Rockwell International Corporation. Electronic presence sensing device. 3,889,118, Cl. 250-341.000.

Walker, Herbert Bryant: *See—*
Hoppough, Richard Scott; and Walker, Herbert Bryant, 3,889,073.

Walker, Robert G., to Industra Products, Inc. Insulating wedge insertion. 3,888,638, Cl. 29-205.00E.

Walker, Walter P., to Audichron Company, The. Message announcement apparatus and method. 3,889,291, Cl. 360-12.000.

Wallace, Bruce Evans. Cylinder plating rack. 3,888,755, Cl. 204-272.000.

Wallace, Louie E., to W. F. Larson, Inc. Tree trimming apparatus. 3,888,071, Cl. 56-237.000.

Wallace, Maynard. Sinker and swivel shield. 3,888,036, Cl. 43-44.970.

Wallace, Michael A., to General Motors Corporation. Engine accessory drive support. 3,888,226, Cl. 123-195.00A.

Wallenhorst, Francis C.: *See—*
Nord, Kermit; and Wallenhorst, Francis C., 3,888,179.

Walsh, Robert. High speed transportation system. 3,888,185, Cl. 104-89.000.

Walstra, Hidde: *See—*
Steinmetz, Anthony; and Walstra, Hidde, 3,889,098.

Walters, John E. Hydraulic pile driver. 3,888,317, Cl. 173-43.000.

Walther & Cie Aktiengesellschaft: *See—*
Landsberg, Ernst, 3,888,314.

Walton, Mace Edward. Drive cap guide assembly for interconnecting adjoining sheet sections. 3,887,986, Cl. 29-271.000.

Wang, Wei-Ming, to General Motors Corporation. Power tuned wave interference silencer. 3,888,331, Cl. 181-44.000.

Wank, Joachim; Reese, Eckart; Rohrbach, Josef; and Bruck, Rolf, to Bayer Aktiengesellschaft. Process for the continuous coating of plastics. 3,889,040, Cl. 428-412.000.

Wannan, Ian Richard, to Wannan Industries Pty. Ltd. Water cut-off means. 3,888,276, Cl. 137-402.000.

Wannan Industries Pty. Ltd.: *See*—
Wannan, Ian Richard, 3,888,276.

Ware, H. Joe, to Kamar Incorporated. Figure with simulated heartbeat. 3,888,233, Cl. 128-1.00C.

Warthen, Raymond L., to Berkley & Company, Inc. Polychroic fishing line. 3,888,037, Cl. 43-44.980.

Warwick Electronics Inc.: *See*—
Arya, Manohar L., 3,889,156.

Watanabe, Kiyoshi; Hirakawa, Tamotsu; Takahara, Kenji; Nakamura, Yoshio; Iwasaki, Sueo; and Tanaka, Tutomu, to Kanegafuchi Chemical Industries Co., Ltd. Process of producing L-lysine using mixed microorganisms. 3,888,737, Cl. 195-28.00R.

Watanabe, Masanori, to Toppan Printing Co., Ltd. Folding container for liquids. 3,888,163, Cl. 93-36.010.

Watanabe, Mikio: *See*—
Tanaka, Hideki; Ishida, Kazutaka; Watanabe, Mikio; Inouchi, Mitsuhiro; Yoshioka, Shigeru; Handa, Minoru; and Kitabatake, Asao, 3,889,265.

Watanabe, Tetsuo: *See*—
Mase, Shunzo; and Watanabe, Tetsuo, 3,889,041.

Waterhouse, Harlan L., to Tonka Corporation. Miniature toy camper trailer. 3,888,040, Cl. 46-201.000.

Watertite Industries, Inc.: *See*—
Allen, Jeral D., 3,888,099.

Watrous, Stephen R.: *See*—
Harmon, James E.; Watrous, Stephen R.; and Diamond, Herrick R., 3,887,963.

Watt, Peter Ridgway; and Wilkinson, Harold George, to Beecham Group Limited. Device for administration of medicines. 3,888,253, Cl. 128-266.000.

Wean United, Inc.: *See*—
Kent, Francis Joseph; and Steinbrook, Seymour E., 3,888,168.

Weatherhead Company, The: *See*—
Moreiras, Luis, 3,888,522.

Weaver, Ebon Paul, to Uniroyal, Inc. Modified ABS polymers. 3,888,941, Cl. 260-829.000.

Weaver, Elbert K.: *See*—
Klar, Erhard; and Weaver, Elbert K., 3,888,657.

Wecker, Leon S., to Topp Electronics, Inc. Electronic clock. 3,888,075, Cl. 58-38.000.

Wehde, Heinz, to Teldix GmbH. Levitated rotary magnetic device. 3,888,553, Cl. 308-10.000.

Weinberger, Eugene M.: *See*—
Last, Bernard; Weinberger, Eugene M.; Gray, James R.; Clements, George W.; and Deffenbaugh, Ralph E., 3,888,106.

Weinstein, Benjamin: *See*—
Young, Lewis B.; Weinstein, Benjamin; and Jurewicz, Anthony T., 3,888,886.

Weir, George: *See*—
Adickes, Fred; Livesey, James R.; Weir, George; Bailey, Dennis; and Mehelich, John J., 3,888,483.

Weise, Lutz: *See*—
Reinecke, Erich; Isernhagen, Fritz; Klatt, Alfred; Weise, Lutz; Schlamann, Wilhelm; and Lindemann, Klaus, 3,888,550.

Weiser, Curtis E.: *See*—
Milewski, Marcel F.; and Weiser, Curtis E., 3,889,285.

Weiss, Donald Eric: *See*—
Willis, Donald; Battaerd, Hendrik Adriaan Jacobus; Lang, Gunter Anton; and Weiss, Donald Eric, 3,888,928.

Weissman, Bernard. Saw blade guard. 3,888,148, Cl. 83-100.000.

Welding Institute, The: *See*—
Needham, James C., 3,889,094.

Weldon, Hazel W., executrix: *See*—
Weldon, Weldon K., deceased; and Weldon, Hazel W., executrix, 3,888,266.

Weldon, Weldon K., deceased; and Weldon, Hazel W., executrix, to Weldon, Hazel W., executrix. Hair curling roller. 3,888,266, Cl. 132-39.000.

Wells, Rodney Lee: *See*—
Crescentini, Lamberto; and Wells, Rodney Lee, 3,888,944.

Wendorf, Ovaldo. Ship hull construction. 3,888,200, Cl. 114-56.000.

Werbel, Burton: *See*—
Tatyrek, Alfred F.; and Werbel, Burton, 3,888,785.

Wesley, Sam, Sr. End blown free air-reed flute. 3,888,154, Cl. 84-384.000.

Wessel, Wolf, to Robert Bosch G.m.b.H. Method and system to protect electronic switching components. 3,889,159, Cl. 317-31.000.

Wessman, Bo Henry, to AB Motala Verkstad. Appliance lid interlock mechanism with lid operated switch and solenoid controlled lid latch. 3,889,078, Cl. 200-61.640.

West, Edward J.; and Giallorenzi, Thomas G., to United States of America, Navy. Method for forming an optical wave guide coupler. 3,888,648, Cl. 65-30.000.

Westcott, David Thomas; and Woodman, Geoffrey Roger, to Imperial Tobacco Group Limited. Tobacco smoke filter. 3,888,160, Cl. 93-1.00C.

Western Electric Company, Incorporated: *See*—
Maselli, Nicholas F., 3,888,054.

Western Rock Bit Company Limited: *See*—
White, Kenneth M., 3,888,028.

Westinghouse Air Brake Company: *See*—
Grundy, Reed H., 3,889,201.
Noble, Peter M., 3,888,183.

Westinghouse Bremsen-und Apparatebau GmbH: *See*—
Luhdorff, Dieter, 3,889,128.
Reinecke, Erich; Isernhagen, Fritz; Klatt, Alfred; Weise, Lutz; Schlamann, Wilhelm; and Lindemann, Klaus, 3,888,550.

Westinghouse Canada Limited: *See*—
McKenzie, George J.; and Ruther, Heinz W., 3,889,225.

Westinghouse Electric Corporation: *See*—
Alliston, William H.; and Johnson, Steven J., 3,889,106.
Brecher, Lee E.; and Wu, Christopher K., 3,888,750.
Emmerich, Werner S.; Kimblin, Clive W.; and Hundstad, Richard L., 3,889,079.
Emmerich, Werner S.; and Holmes, Francis Alan, 3,889,080.
Hundstad, Richard L., 3,889,081.
Lloyd, Raymond A.; and Hrybyk, William L., 3,889,053.
Mackenzie, Raymond W., 3,889,090.
Neuner, James A., 3,888,772.
Peterson, Charles A., 3,889,158.
Rushing, Frank C.; and Ley, Gordon S., 3,888,562.
Shoupp, William E.; and Bechtold, James H., 3,888,658.
Tarneja, Krishan S.; and Bartko, John, 3,888,701.
Tosato, Lawrence; Abel, Leon A.; and Mullis, Clyde M., 3,889,231.

Weston, William A. Air bleeding device for a pressurised liquid supply system. 3,888,274, Cl. 137-174.000.

Wetzel, Rodney J., to Dixieco, Inc. Method of and apparatus for positioning and correlating the end of remedial tubing in relation to the lower end of production tubing in a subterranean well. 3,888,306, Cl. 166-255.000.

Wetzel, William H.: *See*—
Amundsen, Joseph; Wetzel, William H.; Naimy, Norma; and Goodwin, Robert J., 3,889,020.

Weyerhaeuser Company: *See*—
Fraser, Richard S.; Allison, Cecil J., Jr.; Caster, Richard W.; McConnel, Ronald J.; Kribich, Roland E.; and Jone, Paul Y., 3,888,715.

Whelan, Robert D.: *See*—
Gibson, Richard D.; and Whelan, Robert D., 3,889,196.

Whetzel, Lawrence C.; and Townsend, Margaret E., to Bio-Reagents & Diagnostics, Inc. Reagents and methods for determining amylase concentrations. 3,888,739, Cl. 195-99.000.

Whicker, Stephen L.; and Taylor, Carol O., to Texas Instruments Incorporated. Cryogenic cooler off-axis drive mechanism for an infrared receiver. 3,889,119, Cl. 250-352.000.

Whirlpool Corporation: *See*—
Bashark, Larry Thomas, 3,888,269.

Whitaker, Roger B.: *See*—
Klusmann, Donald L.; Soh, Jin Y.; and Whitaker, Roger B., 3,889,173.

White, Berta A. I.; and Lines, William G., to Kincob Limited. Equipment for designing and making costumes. 3,888,009, Cl. 33-12.000.

White Farm Equipment Company: *See*—
Deckler, Harry C., 3,888,387.

White, John U. Grating monochromator. 3,888,590, Cl. 356-101.000.

White, Joseph Paul; and Delpriore, Paul Joseph, to RCA Corporation. Method of shaping semiconductor workpiece. 3,888,053, Cl. 51-281.0SF.

White, Kenneth M., to Western Rock Bit Company Limited. Digger tooth. 3,888,028, Cl. 37-142.00R.

White, Michael L., to Rohm and Haas Company. Retroreflective film. 3,889,027, Cl. 428-34.000.

White Motor Corporation: *See*—
Ziegele, Heinrich H., 3,888,142.

White Polytechniques Limited: *See*—
White, Robert Eric; and Lightfoot, Robert Oscar, 3,888,070.

White, Robert Eric; and Lightfoot, Robert Oscar, to White Polytechniques Limited. Saddle trees and saddles. 3,888,070, Cl. 54-44.000.

White, William F.: *See*—
Easley, Wesley C.; White, William F.; and Wingfield, George A., 3,889,182.

Whittaker, Kenneth; and Morgan, David Ronald, to Dunlop Limited. Flame retardant composite articles. 3,889,022, Cl. 428-262.000.

Whyte, David Denzil: *See*—
Sampson, Ronald Lee; and Whyte, David Denzil, 3,888,998.

Wicenec, Leopold: *See*—
Spannknebel, Walter; and Wicenec, Leopold, 3,888,724.

Wiczer, Sol B. Coated filament and method of forming same. 3,889,038, Cl. 428-361.000.

Wiedemann, Wolfgang, to Hoechst Aktiengesellschaft. Electrophotographic recording material with quinacridones. 3,888,665, Cl. 96-1.500.

Wieske, Theophil: *See*—
Brammer, Klaus-Rudiger; and Wieske, Theophil, 3,889,005.

Wightman, Robert H.: *See*—
Narang, Saran A.; Dheer, Surinder K.; and Wightman, Robert H., 3,888,950.

Wiig, Chester M., to F. J. Littell Machine Company. Loop control apparatus for continuous strip material. 3,888,400, Cl. 226-43.000.

Wiiki, Leroy E.; and Sitek, George J., to Leco Corporation. Electronic balance. 3,888,321, Cl. 177-165.000.

Wilhelm, Frederick C., to Universal Oil Products Company. Hydrocarbon conversion with a sulfided bimetallic catalytic composite. 3,888,763, Cl. 208-139.000.

Wilkinson, Harold George: *See*—
Watt, Peter Ridgway; and Wilkinson, Harold George, 3,888,253.

Wilks, Gerald W.: *See*—
Colwell, Robert E.; Liegois, William A.; Wilks, Gerald W.; and Vrcelj, Mihailo J., 3,888,973.

Willems, Antonius Gerhardus Maria, to U.S. Philips Corporation. Fungicidal 4-thiocyano quinazoline compounds. 3,888,857, Cl. 260-251.00Q.
Willens, Ronald Howard: *See*—
Lou, David Yuan Kong; and Willens, Ronald Howard, 3,889,272.
Willey, Ronald Albert, to Firestone Tire & Rubber Company, The. Bifurcated shoulder and lap continuous safety harness. 3,888,509, Cl. 280-150.0SB.
Williams, Merlyn Morris, to Alcan Research and Development Limited. Monitoring and controlling kiln operation in calcination of coke. 3,888,621, Cl. 432-19.000.
Williams, Raymond H. Presetting fixture for cam actuated turret lathes. 3,888,015, Cl. 33-185.00R.
Willis, Donald; Battaerd, Hendrik Adriaan Jacobus; Lang, Gunter Anton; and Weiss, Donald Eric, to ICI Australia Limited; and Commonwealth Scientific and Industrial Research Organization. 1,4-Bis(diallylaminomethyl)-benzene. 3,888,928, Cl. 260-570.900.
Willits, Samuel P.: *See*—
Mohan, William L.; and Willits, Samuel P., 3,889,136.
Willyard, James C. Marine propulsion system. 3,888,202, Cl. 115-16.000.
Wilson, David G., to Massachusetts Institute of Technology. Automatic refuse reclamation system. 3,888,351, Cl. 209-75.000.
Wilson, Floyd Leroy. Method of securing two members together with a fastener. 3,887,990, Cl. 29-450.000.
Wilson, Kenneth R. A.: *See*—
Bonn, Clifford; and Wilson, Kenneth R. A., 3,888,504.
Wind, Harold, to Lescoa, Inc. Windshield wiper fluid dispenser. 3,887,956, Cl. 15-250.040.
Wingfield, George A.: *See*—
Easley, Wesley C.; White, William F.; and Wingfield, George A., 3,889,182.
Winslow, Lester M.; and Brown, Hazel E., to United States of America, Navy. Liquid cooled attenuator. 3,889,149, Cl. 315-3.500.
Winter, Charles M. Trailer hitch mechanism. 3,888,515, Cl. 280-476.00R.
Wise, Kensall D.; and Samaun. Method for forming regions of predetermined thickness in silicon. 3,888,708, Cl. 156-11.000.
Witzel, Bruce E.: *See*—
Shen, Tsung-Ying; Greenwald, Richard B.; Jones, Howard; Linn, Bruce O.; and Witzel, Bruce E., 3,888,902.
Wojtasinski, Ronald J.; Jones, James H.; and Lisle, Raymond V., to United States of America, General Counsel-Code GP. Lightning current measuring systems. 3,889,185, Cl. 324-72.000.
Wojtowicz, John A., to Olin Corporation. Preparation of alkali metal salts of dichloroisocyanuric acid. 3,888,856, Cl. 260-248.00C.
Wolowodiuk, Walter, to Foster Wheeler Corporation. Liquid metal steam generator. 3,888,212, Cl. 122-32.000.
Wolverine Toy Company: *See*—
Adickes, Fred; Livesey, James R.; Weir, George; Bailey, Dennis; and Mehelich, John J., 3,888,483.
Woodman, Geoffrey Roger: *See*—
Westcott, David Thomas; and Woodman, Geoffrey Roger, 3,888,160.
Woods Hole Oceanographic Institution: *See*—
Knott, Sydney T.; Hess, Frederick R.; and Nowak, Richard T., 3,889,230.
Woods, Thomas G., to Battle Creek Equipment Company. Moist heating pad. 3,889,101, Cl. 219-527.000.
Worthen, Eugene P., deceased; and New England Merchant Natl. Bank, executor, to United Aircraft Corporation. Reversible reduction gear system and brake for marine drive. 3,888,337, Cl. 192-4.00C.
Wristers, Jos P.: *See*—
Siskin, Michael; and Wristers, Jos P., 3,888,937.
WSF Industries Inc.: *See*—
Piegza, Henry J., 3,888,045.
Wu, Christopher K.: *See*—
Brecher, Lee E.; and Wu, Christopher K., 3,888,750.
Wu, Yao Hua; and Lobeck, Walter G., Jr., to Mead Johnson & Company. 10-Imidoylphenoxazines. 3,888,852, Cl. 260-244.00R.
Wylie, Alan Wilson: *See*—
Holmes, Ralph John; Wylie, Alan Wilson; and McCracken, Kenneth Gordon, 3,889,112.
Xerox Corporation: *See*—
Bocek, Robert P., 3,889,292.
Caldwell, John R., 3,888,581.
Cross, Thomas R., 3,888,585.
Gerace, Robert E.; Gary, William L.; and Hull, Charles J., Jr., 3,888,208.
Griswold, Augustus W., 3,888,582.
Hughes, Gordon F., 3,889,139.
Leder, Lewis B., 3,888,892.
Lee, Lieng Huang, 3,888,667.
Meyer, Edwin A., 3,888,577.
Perreault, Donald A.; Bedzyk, Victor Lee; Matthews, Larry Richard; Rivers, Roy Wilben; Shuey, David Rolling; and Torpie, John David, 3,889,057.
Rodek, Victor; and Ticknor, Raymond G., 3,888,579.
Roetling, Paul G., 3,888,591.
Smith, Craig A., 3,888,584.
Stolka, Milan, 3,888,670.
Thettu, Raghulinga R., 3,888,622.
Yagi, Motohiko: *See*—
Kuriyama, Takayuki; and Yagi, Motohiko, 3,888,646.
Kuwayama, Shigeo; and Yagi, Motohiko, 3,889,021.
Yamada, Akitoshi: *See*—
Goto, Toshiyuki; Kido, Kouichi; and Yamada, Akitoshi, 3,889,060.
Yamagishi, Sokichi: *See*—
Okada, Takashi; Yamagishi, Sokichi; Kamoshida, Mototaka; Satake, Tomomitsu; and Kishi, Sadayuki, 3,887,993.
Yamaguchi, Kazuo; Kanoh, Natsuki; Ito, Isao; and Enokido, Nobuo, to Mitsubishi Chemical Industries Ltd. Process for preparing improved ethylene copolymer. 3,888,834, Cl. 260-80.700.
Yamaguchi, Kiminori, to Nippon Gakki Seiko Kabushiki Kaisha. Tremolo generating device with multi-directionally rotating speaker. 3,888,333, Cl. 181-143.000.
Yamamoto, Kiyoshi; and Yamashita, Gentaro, to Teijin Ltd. Method for purifying 2,6-naphthalenedicarboxylic acid. 3,888,921, Cl. 260-525.000.
Yamamoto, Osamu; Takenaga, Mutsuo; and Tsujimoto, Yoshinobu, to Matsushita Electric Industrial Co., Ltd. Standard light source utilizing spontaneous radiation. 3,889,124, Cl. 250-493.000.
Yamana, Hirosuke; Kunii, Tadashi; Furusawa, Tomotaka; Sugimura, Yoshihiro; Nakai, Hiroshi; and Hiro, Yasuo, to Mitsubishi Gas Chemical Co., Inc. Process for preparing aromatic polycarbonates. 3,888,826, Cl. 260-47.0XA.
Yamashita, Gentaro: *See*—
Yamamoto, Kiyoshi; and Yamashita, Gentaro, 3,888,921.
Yashika Co., Ltd.: *See*—
Takahata, Hisatoshi; and Tanikawa, Kohji, 3,889,278.
Yates, Jack; and Long, John W., to Exxon Nuclear Company, Inc. Nuclear fuel bundle disassembly and assembly tool. 3,887,980, Cl. 29-200.00D.
Yates, Michael Joseph; and Hurst, Kenneth James, to Pioneer Welding Company Limited. Invalid bed. 3,887,951, Cl. 5-90.000.
Yates, Paul Clifford, to du Pont de Nemours, E. I., and Company. Preparation of stannic oxide aquasols and organosols. 3,888,788, Cl. 252-309.000.
Yazaki, Mutsunobu: *See*—
Taguchi, Tetsuya; Yazaki, Mutsunobu; and Matsuda, Mutsuhide, 3,889,281.
Yazawa, Kenichiro: *See*—
Maekawa, Yukio; Miyano, Shizuo; Yazawa, Kenichiro; and Kondo, Asaji, 3,888,689.
Yeda Research & Development Co., Ltd.: *See*—
Elson, David; and Avital, Shlomo, 3,888,759.
Yie, Gene G.; Cummingham, S. J.; and Rosenberg, Robert E., to Institute of Gas Technology; and Southern California Gas Company. Irrigation engine exhaust conversion to obtain fertilizing solution. 3,888,652, Cl. 71-61.000.
Yih, Roy Y.: *See*—
Bayer, Horst O.; Swithenbank, Colin; and Yih, Roy Y., 3,888,932.
Yindra, Leonard J.; and Karl, Robert A., to American Hospital Supply Corporation. Adjustable support column. 3,888,444, Cl. 248-188.500.
Yokohama Rubber Co., Ltd., The: *See*—
Koyama, Masao; Okada, Noboru; and Ogawa, Masahiro, 3,888,717.
Yoshida, Kenji; Sekiya, Tetsuo; and Higo, Toyokazu, to Sony Corporation. Tape drive system. 3,888,403, Cl. 226-188.000.
Yoshikawa, Hiromi; Sawada, Katsuo; Asanari, Shigeyuki; Kajikawa, Saburo; and Kodama, Takao, to Matsushita Electric Industrial Co., Ltd. Electric vacuum cleaner and stool. 3,888,643, Cl. 55-274.000.
Yoshino, Akira; and Imanishi, Hitoshi, to Matsushita Electric Works, Ltd. Circuit breaker. 3,889,215, Cl. 335-6.000.
Yoshioka, Shigeru: *See*—
Tanaka, Hideki; Ishida, Kazutaka; Watanabe, Mikio; Inouchi, Mitsuhiro; Yoshioka, Shigeru; Handa, Minoru; and Kitabatake, Asao, 3,889,265.
Yoshisato, Eishin: *See*—
Fujita, Yutaka; Naruchi, Tatsuyuki; and Yoshisato, Eishin, 3,888,845.
Yoshizawa, Munetoshi: *See*—
Mizuno, Kimio; Ando, Takuji; Tsujino, Masatoshi; Takada, Masaki; Yoshizawa, Munetoshi; Matsuda, Tetsuo; and Hayashi, Mitsuo, 3,888,843.
Young Daybrook, Inc.: *See*—
Pilz, Gilbert B.; and Vivian, James R., 3,888,513.
Young, Lewis B.; Weinstein, Benjamin; and Jurewicz, Anthony T., to Mobil Oil Corporation. Oxidation of alkanes to maleic anhydride using promoted vanadium-phosphorus catalyst. 3,888,886, Cl. 260-346.800.
Yount, Robert Eugene. Pipe holder. 3,888,265, Cl. 131-260.000.
Yourman, Maxine N. Baked product and process for preparing same. 3,889,003, Cl. 426-580.000.
Zahradka, Johann. Safety ski binding. 3,888,497, Cl. 280-11.35T.
Zajic, James. Sidewalk plug-in pole for car heaters, warmers and the like. 3,888,336, Cl. 191-1.00R.
Zaleski, Frank I.: *See*—
Sczerzenie, Francis E.; and Zaleski, Frank I., 3,888,636.
Zambrano, Damaso P. Hole cutting apparatus. 3,888,068, Cl. 30-358.000.
Zapart, Bruno J.: *See*—
Foshee, Wayne O.; and Zapart, Bruno J., 3,888,230.
Zaugg, Roland; and Fluck, Josef, to A. Schild S.A. Calender-watch movement. 3,888,076, Cl. 58-58.000.
Zdanys, John; and Kelver, William L., to CTS Corporation. Electrical component with push-push switch actuator. 3,889,088, Cl. 200-330.000.

Zenith Radio Corporation: *See*—
Rennick, John L., 3,889,288.
Zenon, Raymond A., to Atlantic Richfield Company. Device for mounting and demounting guides on a carrying rod. 3,887,985, Cl. 29-267.000.
Ziegele, Heinrich H., to White Motor Corporation. Power drive dolly with two-speed drive system. 3,888,142, Cl. 74-852.000.
Zimmer, Erich: *See*—
Hein, Kurt; and Zimmer, Erich, 3,888,787.
Zimmermann, Detlef; Lougheed, James Hugh; and Crompton, Eric John, to Northern Electric Company Limited. Electromagnetically resonant device. 3,889,262, Cl. 343-18.00B.
Zitko, Henry D. Golf club. 3,888,484, Cl. 273-80.00C.
Zonneveld, Laurens; and Ehs, Eugene, to Controls Company of America. Fuel oil flow controls. 3,888,277, Cl. 137-405.000.
Zubick, Frank P., Jr. Water ski vehicle. 3,888,204, Cl. 115-70.000.
Zubke, Raymond H. Ground anchor with pivoting fluke. 3,888,057, Cl. 52-163.000.
Zundorf, Dieter: *See*—
Juntgen, Harald; Knoblauch, Karl; and Zundorf, Dieter, 3,888,958.
Zusack, Michael J.: *See*—
Laforet, Henry A.; and Zusack, Michael J., 3,888,293.
Zuvela, Bernard R., to Scientific Drilling Controls. Auto-pilot. 3,888,201, Cl. 114-144.00R.
ZYMA S.A.: *See*—
Courbat, Pierre; and Valenza, Andre, 3,888,990.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 10TH DAY OF JUNE, 1975

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Anderson, Clare C.: *See*—
Buswell, Wallace H. Re. 28,446.

Bonner, Joseph A., and H. J. Evans, to Rockwell International Corp. Service regulator with high-low pressure cut-off device. Re. 28,447, 6–10–75, Cl. 137—613.

Buswell, Wallace H., assignor of a fractional part interest to Clare C. Anderson. Eccentric acting float-controlled pinch-valve vessel filling assembly. Re. 28,446, 6–10–75, Cl. 137—1.

California Microwave Inc.: *See*—
Lance, Drew R. Re. 28,452.

Continental Oil Co.: *See*—
Edmond, Tibor O. Re. 28,449.

Deere & Co.: *See*—
Zaun, Richard D., and Hook. Re. 28,448.

Edmond, Tibor O., to Continental Oil Co. Anchoring and pressuring apparatus for a drill. Re. 28,449, 6–10–75, Cl. 175—94.

Evans, Howard J.: *See*—
Bonner, Joseph A., and Evans. Re. 28,447.

Hook, Richard W.: *See*—
Zaun, Richard D., and Hook. Re. 28,448.

Kreuser, Marvin J.: *See*—
Spleha, David J., and Kreuser. Re. 28, 451.

Lance, Drew R., to California Microwave Inc. Dual bandwidth phase lock loop. Re. 28,452, 6–10–75, Cl. 331—17.

Madland, Thorvald: *See*—
Ross, Irving D., Jr., and Madland. Re. 28,443.

Parker-Hannifin Corp.: *See*—
Spleha, David J., and Kreuser. Re. 28, 451.

Rockwell International Corp.: *See*—
Bonner, Joseph A., and Evans. Re. 28,447.

Ross, Irving D., Jr., and T. Madland, to The Youngstown Steel Door Co. Over-travel and return mechanism for door. Re. 28,443, 6–10–75, Cl. 49—220.

Saylor, Edward T., Jr. Rotary apparatus. Re. 28,444, 6–10–75, Cl. 60—39.610.

Schlumberger Technology Corp.: *See*—
Schwartz, Robert J. Re. 28,450.

Schwartz, Robert J., to Schlumberger Technology Corp. Two detector pulse neutron logging porosity technique. Re. 28,450, 6–10–75, Cl. 250—264.

Skuttle Mfg. Co.: *See*—
Stiles, Walter R. Re. 28,445.

Spleha, David J., and M. J. Kreuser, to Parker-Hannifin Corp. Radiation detecting apparatus. Re. 28,451, 6–10–75, Cl. 250—366.

Stiles, Walter R., to Skuttle Mfg. Co. Rotary humidifier drive. Re. 28,445, 6–10–75, Cl. 74—405.

Youngstown Steel Door Co., The: *See*—
Ross, Irving D., Jr., and Madland. Re. 28,443.

Zaun, Richard D., and R. W. Hook, to Deere & Co. Root crop harvesting implement. Re. 28,448, 6–10–75, Cl. 171—58.

LIST OF PLANT PATENTEES

Jackson & Perkins Co.: *See*—
Warriner, William A. 3,727.
Warriner, William A. 3,728.
Warriner, William A. 3,729.

Warriner, William A., to Jackson & Perkins Co. Rose plant. 3,727, 6–10–75, Cl. 20.

Warriner, William A., to Jackson & Perkins, Co. Rose plant. 3,728, 6–10–75, Cl. 26.

Warriner, William A., to Jackson & Perkins, Co. Rose plant. 3,729, 6–10–75, Cl. 18.

LIST OF DESIGN PATENTEES

Abbott Laboratories: *See*—
Betka, Harold A. 235,310.

Aiello, Salvatore F., to Loed Corp. Compactor. 235,374, 6–10–75, Cl. D60—1.

AMF Inc.: *See*—
Brucker, Stephen F. 235,360.
Pauza, William V., and Sheesley. 235,348.

American Hospital Supply Corp.: *See*—
Lanigan, Richard W., and Szymber. 235,302.

Araki, Minol, to Lloyd's Electronics Inc. Digital clock radio. 235,373, 6–10–75, Cl. D56—4.

Armstrong, William H.: *See*—
Ponkey, Jack L., and Armstrong. 235,371.

Aspro Nicholas, Ltd.: *See*—
Cramphorn, Ronald F. 235,314.

Astec Industries, Inc.: *See*—
Mize, Erbie G., and Smith. 235,337.

Baker, Allister L.: *See*—
Kool, J. Peter E., and Baker. 235,375.

Barthropp, Francis M. L., to Barton of Canada Ltd. Toy water gun. 235,363, 6–10–75, Cl. D34—15.

Barton of Canada Ltd.: *See*—
Barthropp, Francis M. L. 235,363.

Bee, James W. M.: *See*—
Mahan, John A., Bee, and Tyson. 235,321.

Bender, Richard E.: *See*—
Schaefer, William H., and Bender. 235,357.

Benson, Raymond E., to Olin Corp. Portable heater or similar article. 235,346, 6–10–75, Cl. D23—122.

Benton, William R. Pool basket-ball goal. 235,361, 6–10–75, Cl. D34—5.

Berkline Corp., The: *See*—
Long, Stapleton. 235,289.

Betka, Harold A., to Abbott Laboratories. Bottle. 235,310, 6–10–75, Cl. D9—10.

Borg-Warner Corp.: *See*—
Korol, Stanley F. 235,341.
Korol, Stanley F. 235,344.

Boucher, Richard A., to Dart Industries, Inc. Patty press. 235,303, 6–10–75, Cl. D7—43.

Brand, Derek A.: *See*—
Imatt, Alexander, and Brand. 235,366.

Brucker, Stephen F., to AMF Inc. Bowling scorer. 235,360, 6–10–75, Cl. D34—5.

Budd Co., The: *See*—
Seraver, Donald M. 235,328.

Christian, Hubert E., and D. W. Lee, to Dart Industries Inc. Plastic knife. 235,306, 6–10–75, Cl. D7—138.

Clarke, Edwin R. Picture hanger stabilizer. 235,308, 6–10–75, Cl. D8—257.

Cohen, Aaron G.: *See*—
Gay, Derek J., Smedley, Cohen, and Nuttall. 235,365.

Corris, C. James, to Warner-Lambert Co. Dispenser for use with aerosol containers. 235,290, 6–10–75, Cl. D6—95.

Couttet, Serge A. Vehicle tire chain applicator. 235,326, 6–10–75, Cl. D12—155.

Covey, Laird F., to The Stanley Works. Stud finder. 235,317, 6–10–75, Cl. D10—46.

Cramer, Ronald G., to S. C. Johnson & Son, Inc. Combined bottle and cap therefor. 235,311, 6–10–75, Cl. D9—107.

Cramphorn, Ronald F., to Aspro Nicholas, Ltd. Carton. 235,-314, 6–10–75, Cl. D9—222.

Dart Industries Inc.: *See*—
Boucher, Richard A. 235,303.
Christian, Hubert E., and Lee. 235,306.

Dawson, Henry W. Combined desk and footrest unit. 235,-285, 6–10–75, Cl. D6—42.

Dazey Products Co.: *See*—
McNair, Samuel L. 235,379.
McNair, Samuel L. 235,380.
McNair, Samuel L. 235,381.
McNair, Samuel L. 235,383.

Deschamps, Robert L., to Shure Brothers Inc. Phonograph stylus. 235,351, 6–10–75, Cl. D26—14.

Deschamps, Robert L., to Shure Brothers Inc. Phonograph stylus. 235,352, 6–10–75, Cl. D26—14.

Dykes, Downer P., to Rival Mfg. Co. Portable electric washer. 235,369, 6–10–75, Cl. D49—1.

EBCO Mfg. Co.: *See*—
Taylor, William. 235,388.

Edstrom, Olle. Gunsight. 235,339, 6–10–75, Cl. D22—8.

Edwards, Bryant, to Illinois Tool Works, Inc. Plastic preform container or the like. 235,313, 6–10–75, Cl. D9—171.
Engle, Leon R. Combined A-frame and deck for mobile homes. 235,335, 6–10–75, Cl. D13—1.
Faraco, William G., Jr. Chemical vapor deposition reactor. 235,356, 6–10–75, Cl. D32—2.
Fassauer, Arthur L., to Fassauer Industries, Inc. Plant feeder. 235,364, 6–10–75, Cl. D35—3.
Fassauer Industries, Inc.: *See*—
Fassauer, Arthur L. 235,364.
Fields, Joseph. Holder for burning incense. 235,345, 6–10–75, Cl. D23—78.
Fisher, Morris F., to Futorian Corp. Settee or similar article. 235,287, 6–10–75, Cl. D6—59.
Foote, J. B., Foundry Co., The: *See*—
Ponkey, Jack L., and Armstrong. 235,371.
Futorian Corp.: *See*—
Fisher, Morris F. 235,287.
Gill, Don R. 235,284.
Gageby, Janet K.: *See*—
Gageby, Steven D. 235,329.
Gageby, Steven D. 235,330.
Gageby, Steven D. 235,331.
Gageby, Steven D. 235,333.
Gageby, Steven D. 235,334.
Gageby, Steven D., to Janet K. Gageby. Wheel. 235,329, 6–10–75, Cl. D12—209.
Gageby, Steven D., to Janet K. Gageby. Wheel. 235,330, 6–10–75, Cl. D12—209.
Gageby, Steven D., to Janet K. Gageby. Wheel. 235,331, 6–10–75, Cl. D12—209.
Gageby, Steven D, to Janet K. Gageby. Wheel. 235,333, 6–10–75, Cl. D12—211.
Gageby, Steven D., to Janet K. Gageby. Wheel. 235,334, 6–10–75, Cl. D12—211.
Gannon, Peter F., to Vinyl-Fab Industries. Safety ladder for swimming pool platform. 235,370, 6–10–75, Cl. D54—1.
Gay, Derek J., W. H. Smedley, A. G. Cohen, and M. W. Nuttall, to Mattel, Inc. Portable display toy. 235,365, 6–10–75, Cl. D34—15.
General Dynamics Corp.: *See*—
Schaefer, William H., and Bender. 235,357.
Gill, Don R, to Futorian Corp. Chair. 235,284, 6–10–75, Cl. D6—37.
Ginat, Jonathan. Bakers rack or similar article. 235,296, 6–10–75, Cl. D6—186.
Glazener, Carey A.: *See*—
Tarbox, Philip B., and Glazener. 235,387.
Greenberg, Sylvan. Meat tenderizer. 235,304, 6–10–75, Cl. D7—101.
HC Products Co.: *See*—
Lee, Albert M. 235,336.
Hamilton, Arthur C. Textile bobbin. 235,338, 6–10–75, Cl. D19—15.
Hanson, Stephen C. Headphones or the like. 235,350, 6–10–75, Cl. D26—14.
Hebbert, Frank M. Stringed musical instrument. 235,372, 6–10–75, Cl. D56—1.
Higginbotham, Kenneth E. Combined motorcycle safety bar and foot rests. 235,323, 6–10–75, Cl. D12—114.
Higginbotham, Kenneth E. Combined motorcycle safety bar and foot rests. 235,324, 6–10–75, Cl. D12—114.
Holiday Rambler Corp.: *See*—
Klinger, Richard E. 235,320.
Illinois Tool Works Inc.: *See*—
Edwards, Bryant. 235,313.
Imatt, Alexander, and D. A. Brand. Combined archery game projector and shuttlecock projectile. 235,366, 6–10–75, Cl. D34—15.220.
Johnson, S. C., & Son, Inc.: *See*—
Cramer, Ronald G. 235,311.
Junion, Melville E. Book cart or similar article. 235,295, 6–10–75, Cl. D6—184.
Keating, Lawrence W. Combined revolving condiment server and candle holder or the like. 235,299, 6–10–75, Cl. D7—2.
Keuffel & Esser Co.: *See*—
Kool, J. Peter E. 235,318.
Kool, J. Peter E. 235,319.
Kool, J. Peter E., and Baker. 235,375.
Klinger, Richard E., to Holiday Rambler Corp. Houseboat or the like. 235,320, 6–10–75, Cl. D12—67.
Kool, J. Peter E. to Keuffel & Esser Co. Automatic optical level or the like. 235,318, 6–10–75, Cl. D10—66.
Kool, J. Peter E., to Keuffel & Esser Co. Optical builders level or the like. 235,319, 6–10–75, Cl. D10—66.
Kool, J. Peter E., and A. L. Baker, to Keuffel & Esser Co. Laser grading transit or the like. 235,375, 6–10–75, Cl. D10—66.
Korol, Stanley F.,to Borg-Warner Corp. Handle for water closets or the like. 235,341, 6–10–75, Cl. D23—29.
Korol, Stanley F., to Borg-Warner Corp. Lavatory. 235,344, 6–10–75, Cl. D23—58.
Kotuby, Paul M., to The Risdon Mfg. Co. Valve actuator and dispensing head for a pressurized container. 235,315, 6–10–75, Cl. D9—258.
Kretz, Edward J., to Owens-Illinois, Inc. Bottle. 235,312, 6–10–75, Cl. D9—127.
Ku Lee, Young, to Kyung Sung Rubber Co., Ltd. Knee boot. 235,283, 6–10–75, Cl. D2—275.
Kurozumi, Shigeru, to Sharp Kabushiki Kaisha. Electronic calculating machine. 235,349, 6–10–75, Cl. D26—5.
Kyung Sung Rubber Co., Ltd.: *See*—
Ku Lee, Young. 235,283.
Lanigan, Richard W., and O. Szymber, to American Hospital Supply Corp. Dish. 235,302, 6–10–75, Cl. D7—23.
Lee, Albert M., to HC Products Co. Reversible shutter. 235,336, 6–10–75, Cl. D13—1.
Lee, David W.: *See*—
Christian, Hubert E., and Lee. 235,306.
Lloyd's Electronics Inc.: *See*—
Araki, Minol. 235,373.
Loed Corp.: *See*—
Aiello, Salvatore F. 235,374.
Long, Stapleton, to The Berkline Corp. Chair. 235,289, 6–10–75, Cl. D6—71.
Mahan, John A., J. W. M. Bee, and J. F. Tyson, to Northern Electric Co. Ltd. Instrument for detecting electromagnetic resonant devices. 235,321, 6–10–75, Cl. D10—78.
Maremont Corp.: *See*—
Tarbox, Philip B., and Glazener. 235,387.
Martinelli, Arnold C. Chair. 235,286, 6–10–75, Cl. D6—56.
Mason, Joseph E., to New Dimensions Research Corp. Pressure blood infuser. 235,378, 6–10–75, Cl. D83—1.
Mattel, Inc.: *See*—
Gay, Derek J., Smedley, Cohen, and Nuttall. 235,365.
McInnes, Robert P. Tape storage rack. 235,382, 6–10–75, Cl. D87—1.
McNair, Samuel L., to Dazey Co. Hand mounted electrical massager. 235,379, 6–10–75, Cl. D83—1.
McNair, Samuel L., to Dazey Products Co. Hand held power unit for massaging devices. 235,380, 6–10–75, Cl. D83—1.
McNair, Samuel L., to Dazey Products Co. Hand supported electrical massager. 235,381, 6–10–75, Cl. D83—1.
McNair, Samuel L., to Dazey Products Co. Hair drying attachment. 235,383, 6–10–75, Cl. D86—10.
Mederaft, Samuel. Acetabular cup. 235,377, 6–10–75, Cl. D83—1.
Mize, Erbie G., and W. N. Smith, to Astec Industries, Inc. Control house or similar article. 235,337, 6–10–75, Cl. D13—1.
Mize, Erbie G., to Astec Industries, Inc. Storage bin or similar article. 235,340, 6–10–75, Cl. D23—2.
Monarch Metal Products, Inc.: *See*—
Podell, George W. 235,292.
Morris, Arthur L. Pick-up truck canopy. 235,327, 6–10–75, Cl. D12—156.
Mountain, Maurice G., Jr., and W. S. Ripley, to Susquehanna Broadcasting Co. Food and beverage serving set. 235,300, 6–10–75, Cl. D7—3.
Mountain, Maurice G., Jr., and W. S. Ripley, to Susquehanna Broadcasting Co. Food and beverage serving set. 235,301, 6–10–75, Cl. D7—3.
Neverett, Francis H. Building. 235,255, 6–10–75, Cl. D13—1.
New Dimensions Research Corp.: *See*—
Mason, Joseph E. 235,378.
Northern Electric Co. Ltd.: *See*—
Mahan, John A., Bee, and Tyson. 235,321.
Nuttall, Michael W.: *See*—
Smedley, William H., Gay, Cohen, and Nuttall. 235,365.
Olin Corp.: *See*—
Benson, Raymond E. 235,346.
Otto, Walter, to Sethco Mfg. Corp. Filter tube cap. 235,342, 6–10–75, Cl. D23—41.
Otto, Walter, to Sethco Mfg. Corp. Filter tube connector. 235,343, 6–10–75, Cl. D23—43.
Owens-Illinois, Inc.: *See*—
Kretz, Edward J. 235,312.
Pauza, William V., and W. L. Sheesley, to AMP Inc. Electrical tab receptacle. 235,348, 6–10–75, Cl. D26—1.
Peets, Robert S., to The Singer Co. Vertically adjustable sewing machine cabinet. 235,376, 6–10–75, Cl. D70—1.
Podell, George W., to Monarch Metal Products, Inc. Desk. 235,292, 6–10–75, Cl. D6—161.
Ponkey, Jack L., and W. H. Armstrong, to The J. B. Foote Foundry Co. Cement mixer. 235,371, 6–10–75, Cl. D55—1.
Pray, Richard H. Exerciser. 235,362, 6–10–75, Cl. D34—5.
Pretty Products, Inc.: *See*—
Wells, Charles A. 235,316.
Richilano, Vincent J., to Zephyr Industries, Inc. Wheel chock. 235,332, 6–10–75, Cl. D12—217.
Rigg, Henry K. Medallion. 235,355, 6–10–75, Cl. D29—19.
Ripley, William S.: *See*—
Mountain, Maurice G., Jr., and Ripley. 235,300.
Mountain, Maurice G., Jr., and Ripley. 235,301.
Risdon Mfg. Co., The: *See*—
Kotuby, Paul M. 235,315.
Rival Mfg. Co.: *See*—
Dykes, Downer P. 235,369.
Rowenta-Werke GmbH: *See*—
Stuetzer, Franz A. 235,368.
Salviato, Augusto, Article of flatware. 235,305, 6–10–75, Cl. D7—137.
Schaefer, William H., and R. E. Bender, to General Dynamics Corp. Tennis racket. 235,357, 6–10–75, Cl. D34—5.
Schafer, Carol. Aerosol container. 235,309, 6–10–75, Cl. D9—8.
Schick, George L., to Warner-Lambert Co. Cigarette lighter. 235,353, 6–10–75, Cl. D27—39.
Schick, George L., to Warner-Lambert Co. Cigarette lighter. 235,354, 6–10–75, Cl. D27—39.
Schuyler, Roger S. End standard for a furniture seat. 235,297, 6–10–75, Cl. D6—194.
Schuyler, Roger S. End standard for a furniture seat. 235,298, 6–10–75, Cl. D6—194.
Scraver, Donald M., to The Budd Co. Wheel. 235,328, 6–10–75, Cl. D12—211.
Sethco Mfg. Corp.: *See*—
Otto, Walter. 235,342.
Otto, Walter. 235,343.
Sharp Kabushiki Kaisha: *See*—
Kurozumi, Shigeru. 235,349.
Shaw, Jerry, and S. G. Solitt. Display case. 235,291, 6–10–75, Cl. D6—127.
Sheesley, Wilmer L.: *See*—
Pauza, William V., and Sheesley. 235,348.
Shoemaker, Rita. Combined honey spoon and spreader. 235,307, 6–10–75, Cl. D7—149.

Shure Brothers Inc. : *See*—
Deschamps, Robert L. 235,351.
Deschamps, Robert L. 235,352.
Sill, Robert E. Bicycle rack. 235,322, 6–10–75, Cl. D12—115.
Sill, Robert E. Bicycle rack. 235,325, 6–10–75, Cl. D12—115.
Singer Co., The : *See*—
Peets, Robert S. 235,376.
Smedley, William H. : *See*—
Gay, Derek J., Smedley, Cohen, and Nuttall. 235,365.
Smith, Stanley S., Jr. Ball game board of the hand manipulating type. 235,359, 6–10–75, Cl. D34—5.
Smith, W. Norman : *See*—
Mize, Erbie G., and Smith. 235,337.
Smyth, James A. Key holder. 235,385, 6–10–75, Cl. D87—8.
Solitt, Samuel G. : *See*—
Shaw, Jerry, and Solitt. 235,291.
Stanley Works, The : *See*—
Covey, Laird F. 235,317.
Stuetzer, Franz A., to Rowenta-Werke GmbH. Lighter. 235,368, 6–10–75, Cl. D27—36.
Sullivan, William H., to The Vecta Group, Inc. Multiple seating unit. 235,288, 6–10–75, Cl. D6—59.
Susquehanna Broadcasting Co. : *See*—
Mountain, Maurice G., Jr., and Ripley. 235,300.
Mountain, Maurice G., Jr., and Ripley. 235,301.
Szymber, Oleg : *See*—
Lanigan, Richard W., and Szymber. 235,302.
Tarbox, Philip B., and C. A. Glazener, to Maremont Corp. Safety shield for a textile combining machine. 235,387, 6–10–75, Cl. D92—15.
Taylor, William, to EBCO Mfg. Co. Combined beverage cooler and dispenser. 235,388, 6–10–75, Cl. D94—3.
Telesco Brophey Ltd. : *See*—
Weber, Heinz. 235,386.
Theilkas, Dorothy M. Duffel bag. 235,384, 6–10–75, Cl. D87—5.
Tyson, John F. : *See*—
Mahan, John A., Bee, and Tyson. 235,321.
Vecta Group, Inc., The : *See*—
Sullivan, William H. 235,288.
Vinyl-Fab Industries. : *See*—
Gannon, Peter F. 235,370.
Waltzman, Simon V. Coffee table. 235,293, 6–10–75, Cl. D6—175.
Waltzman, Simon V. Lamp table or pedestal. 235,294, 6–10–75, Cl. D6—175.
Warner-Lambert Co. : *See*—
Corris, C. James. 235,290.
Schick, George L. 235,353.
Schick, George L. 235,354.
Weber, Heinz, to Telesco Brophey Ltd. Umbrella runner with lever. 235,386, 6–10–75, Cl. D88—3.
Wells, Charles A., to Pretty Products, Inc. Combined packaging card and hanger for an article of merchandising. 235,316, 6–10–75, Cl. D9—291.
Yevick, George J. Finger ring. 235,367, 6–10–75, Cl. D45—10.
Young, Fred M., to Young Radiator Co. Industrial radiator for use in low pressure water cooling systems. 235,347, 6–10–75, Cl. D823—139.
Young Radiator Co. : *See*—
Young, Fred M. 235,347.
Zephyr Industries, Inc. : *See*—
Richilano, Vincent J. 235,332.

CLASSIFICATION OF PATENTS

ISSUED JUNE 10, 1975

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

239	3,887,946

CLASS 4

2	3,887,947
213	3,887,948
217	3,887,949

CLASS 5

11	3,887,950
90	3,887,951

CLASS 8

2.5	3,888,623
21C	3,888,624
94.27	3,888,625

CLASS 9

6	3,887,952
11R	3,887,953

CLASS 15

50C	3,887,954
250.04	3,887,956
250.16	3,887,957
250.17	3,887,958
250.22	3,887,955
347	3,887,959

CLASS 16

2	3,887,960
56	3,887,961
72	3,887,962
121	3,887,963

CLASS 17

32	3,887,964

CLASS 21

2.5A	3,888,626
	3,888,627

CLASS 23

230B	3,888,628
	3,888,629
232E	3,888,630
253TP	3,888,631
277C	3,888,632
284	3,888,633
305	3,888,634
313	3,888,635

CLASS 24

16PB	3,887,965
68CD	3,887,966
73PB	3,887,967
266	3,887,968

CLASS 28

1.4	3,887,971
	3,887,972
1.6	3,887,969
72.1	3,887,970

CLASS 29

78	3,887,973
95R	3,887,974
105R	3,887,975
156.8R	3,887,976
157R	3,887,977
159.2	3,887,978
	3,887,979
182	3,888,636
191	3,888,637
200D	3,887,980
203DS	3,887,982
203H	3,887,981
205E	3,888,638
234	3,887,983
243.53	3,887,984
267	3,887,985
271	3,887,986
407	3,887,987
416	3,887,988
427	3,887,989
450	3,887,990
	3,887,991
	3,887,992
571	3,887,993
	3,887,994
572	3,887,995
583	3,887,996
589	3,887,997
	3,887,998
626	3,888,639
628	3,887,999

CLASS 30

114	3,888,000
	3,888,001
162	3,888,002
180	3,888,003
272A	3,888,004
286	3,888,005
298	3,888,006
358	3,888,068

CLASS 32

14D	3,888,007
27	3,888,008

CLASS 33

12	3,888,009
87	3,888,010
126.5	3,888,011
174G	3,888,013
174L	3,888,012
174R	3,888,014
185R	3,888,015
346	3,888,016

CLASS 34

5	3,888,017
99	3,888,018

CLASS 35

12B	3,888,019
17	3,888,020
25	3,888,021
	3,888,022
29R	3,888,023
35H	3,888,025
35R	3,888,024

CLASS 36

25R	3,888,026

CLASS 37

141R	3,888,027
142R	3,888,028

CLASS 40

125G	3,888,029
126R	3,888,030

CLASS 42

1F	3,888,031

CLASS 43

3	3,888,032
6	3,888,033
17	3,888,034
	3,888,035
44.97	3,888,036
44.98	3,888,037
53.5	3,888,038

CLASS 46

12	3,888,039
201	3,888,040

CLASS 47

9	3,888,041
37	3,888,042

CLASS 48

197R	3,888,043

CLASS 49

220	Re.28,443
227	3,888,044
255	3,888,045
319	3,888,046
351	3,888,047

CLASS 51

39	3,888,048
54	3,888,049
135R	3,888,050
165.77	3,888,051
281SF	3,888,053
281R	3,888,052
298	3,888,640
319	3,888,054

CLASS 52

98	3,888,055
109	3,888,056
163	3,888,057
191	3,888,058
241	3,888,059
286	3,888,060
589	3,888,061
749	3,888,062
753D	3,888,063
758F	3,888,064

CLASS 53

43	3,888,065
167	3,888,066
292	3,888,067
381R	3,888,069

CLASS 54

44	3,888,070

CLASS 55

84	3,888,641
263	3,888,642
274	3,888,643
318	3,888,644

CLASS 56

237	3,888,071
320.2	3,888,072

CLASS 58

7	3,888,073
23R	3,888,074
38	3,888,075
58	3,888,076
59	3,888,077

CLASS 60

39.28R	3,888,078
39.61	Re.28,444
245	3,888,079
290	3,888,080
321	3,888,081
361	3,888,082
431	3,888,083
614	3,888,084
635	3,888,085

CLASS 61

1F	3,888,086
11	3,888,087
72.3	3,888,088

CLASS 62

50	3,888,089
240	3,888,090
256	3,888,091
376	3,888,092

CLASS 64

13	3,888,093

CLASS 65

3	3,888,645
18	3,888,646
29	3,888,647
30	3,888,648
60	3,888,649
125	3,888,650
361	3,888,651

CLASS 66

138	3,888,094
163	3,888,095

CLASS 70

209	3,888,096

CLASS 71

61	3,888,652
	3,888,653
78	3,888,654
91	3,888,655
94	3,888,656

CLASS 72

26	3,888,097
56	3,888,098
129	3,888,099
305	3,888,100
364	3,888,119
388	3,888,101
393	3,888,102
399	3,888,103
407	3,888,104
410	3,888,105

CLASS 73

3	3,888,106
12	3,888,108
15B	3,888,107
23	3,888,109
27	3,888,110
40.7	3,888,111
61.1R	3,888,112
64.1	3,888,113
67.8R	3,888,114
88.5R	3,888,115
105	3,888,118
136A	3,888,116
141A	3,888,117
194B	3,888,120
362R	3,888,121
382	3,888,122
421.5A	3,888,123
421.5R	3,888,124
423A	3,888,125
426	3,888,126
431	3,888,127
484	3,888,128

CLASS 74

29	3,888,129
230.17E	3,888,130
241	3,888,131
247	3,888,132
254	3,888,133
405	Re.28,445
	3,888,134
496	3,888,135
594.1	3,888,136
650	3,888,137
665G	3,888,138
687	3,888,139
730	3,888,141
826	3,888,140
852	3,888,142
863	3,888,143

CLASS 75

.5B	3,888,657
11	3,888,658
125	3,888,659
178A	3,888,660
201	3,888,661
203	3,888,662
221	3,888,663

CLASS 81

71	3,888,144

CLASS 82

1C	3,888,145
	3,888,146

CLASS 83

64	3,888,147
100	3,888,148
291	3,888,149
368	3,888,150
411A	3,888,151
471.3	3,888,152

CLASS 84

1.01	3,888,153
384	3,888,154
471	3,888,155

CLASS 85

71	3,888,156

CLASS 89

1B	3,888,158
1K	3,888,157
7	3,888,159
	3,888,255

CLASS 90

11C	3,888,161
13.1	3,888,162

CLASS 93

1C	3,888,160
36.01	3,888,163
53R	3,888,164

CLASS 96

1R	3,888,666
1.4	3,888,664
1.5	3,888,665
	3,888,667
1.6	3,888,668
3	3,888,669
27R	3,888,670
33	3,888,671
35.1	3,888,672
36	3,888,674
36.1	3,888,673
67	3,888,675
68	3,888,676
76R	3,888,677
87A	3,888,678
87R	3,888,679
100	3,888,680
111	3,888,681

CLASS 98

2.14	3,888,165
85	3,888,166

CLASS 99

467	3,888,167

CLASS 100

48	3,888,168
100	3,888,169
177	3,888,170
229A	3,888,171

CLASS 101

156	3,888,172
350	3,888,173
467	3,888,174

CLASS 102

4	3,888,175
31	3,888,177
34.1	3,888,178
66	3,888,179
67	3,888,180
70.2R	3,888,181
73R	3,888,182

CLASS 104

26A	3,888,183
37	3,888,184
89	3,888,185
275	3,888,186

CLASS 105

224.1	3,888,187
282R	3,888,188
367	3,888,189
475	3,888,190
477	3,888,191

CLASS 106

15AF	3,888,682
	3,888,683
	3,888,684
15AT	3,888,176
24	3,888,689
38.24	3,888,690
40V	3,888,691
47R	3,888,685
53	3,888,686
	3,888,686
66	3,888,687
308B	3,888,688

CLASS 108

156	3,888,192

CLASS 110

8F	3,888,193
	3,888,194
99R	3,888,195

CLASS 111

1	3,888,197
10	3,888,196

CLASS 112

252	3,888,198

CLASS 113

80R	3,888,199

CLASS 114

56	3,888,200
144R	3,888,201

CLASS 115

16	3,888,202
41HT	3,888,203
70	3,888,204

CLASS 116

117C	3,888,205

CLASS 118

100	3,888,206
621	3,888,207
637	3,888,208

CLASS 119

1	3,888,209
3	3,888,210
18	3,888,211

CLASS 122

32	3,888,212
478	3,888,213

CLASS 123

32A	3,888,214
	3,888,215
90.15	3,888,216
90.31	3,888,217
97B	3,888,218
97R	3,888,219
117A	3,888,221
117R	3,888,220
119A	3,888,222
136	3,888,223
148E	3,888,225
195A	3,888,226
196R	3,888,227
	3,888,228

CLASS 124

49	3,888,229

CLASS 125

11AT	3,888,230

CLASS 126

120	3,888,231
140	3,888,232

CLASS 128

1C	3,888,233
2A	3,888,239
2E	3,888,237
2F	3,888,235
	3,888,236
2R	3,888,234
2V	3,888,238
2.06E	3,888,240
24.3	3,888,241
64	3,888,242
75	3,888,243
77	3,888,244
78	3,888,245
146.2	3,888,246
155	3,888,247
156	3,888,248
214R	3,888,249
	3,888,250
233	3,888,251
266	3,888,252
	3,888,253
290R	3,888,254
296	3,888,256
	3,888,257
305	3,888,258
400	3,888,259
419PG	3,888,260
420	3,888,261

CLASS 131

29	3,888,262
201	3,888,263
235R	3,888,264
260	3,888,265

CLASS 132

39	3,888,266

CLASS 133

1R	3,888,267

CLASS 134

4	3,888,268
10	3,888,693
32	3,888,694
57D	3,888,269
57R	3,888,270

CLASS 136

24	3,888,695
83R	3,888,696
89	3,888,697
	3,888,698
107	3,888,699
146	3,888,700

CLASS 137

1	Re.28,446
45	3,888,271
155	3,888,273
174	3,888,274
344	3,888,281
391	3,888,275
402	3,888,276
405	3,888,277
613	Re.28,447
625.65	3,888,278
627	3,888,279
630.13	3,888,280

CLASS 138

106	3,888,282
150	3,888,283

CLASS 139

82	3,888,284
123	3,888,272

CLASS 141

168 3,888,285
291 3,888,286

CLASS 144

34E 3,888,287

CLASS 148

1.5 3,888,701
6.14R 3,888,702
11.5R 3,888,703
29 3,888,704
175 3,888,705
187 3,888,706

CLASS 149

19.4 3,888,707

CLASS 150

1 3,888,288

CLASS 151

38 3,888,289

CLASS 152

217 3,888,290
330R 3,888,291
362 3,888,292

CLASS 156

11 3,888,708
48 3,888,709
3,888,710
93 3,888,711
171 3,888,712
3,888,714
181 3,888,713
273 3,888,715
276 3,888,716
351 3,888,717
356 3,888,718
378 3,888,719
414 3,888,720
423 3,888,721
477B 3,888,722
499 3,888,723
541 3,888,724
556 3,888,725

CLASS 162

49 3,888,726
65 3,888,727
167 3,888,728
343 3,888,729

CLASS 164

16 3,888,293
66 3,888,294
72 3,888,295
97 3,888,296
100 3,888,297
137 3,888,298
228 3,888,299
256 3,888,300
341 3,888,301

CLASS 165

1 3,888,302
2 3,888,303
86 3,888,304
113 3,888,305

CLASS 166

255 3,888,306
272 3,888,307
273 3,888,308
274 3,888,309
279 3,888,310
280 3,888,311
308 3,888,312

CLASS 169

16 3,888,313
20 3,888,314

CLASS 171

58 Re.28,448

CLASS 172

7 3,888,315
450 3,888,316

CLASS 173

43 3,888,317
149 3,888,318

CLASS 174

15R 3,889,042
35GC 3,889,043
48 3,889,044
70R 3,889,045
78 3,889,046
84R 3,889,047
94R 3,889,048
102R 3,889,049

CLASS 175

76 3,888,319
94 Re.28,449
394 3,888,320

CLASS 176

38 3,888,730
50 3,888,731
3,888,732
52 3,888,733
61 3,888,734
84 3,888,735

CLASS 177

165 3,888,321

CLASS 178

5.1 3,889,050
5.6 3,889,051
6 3,889,052
3,889,053
6.8 3,889,054
3,889,055
3,889,056
69.5F 3,889,057

CLASS 179

1FS 3,889,058
1GQ 3,889,061
1F 3,889,060
1P 3,889,059
2DP 3,889,062
15BC 3,889,065
15BS 3,889,064
15A 3,889,063
16F 3,889,066
18BG 3,889,068
18F 3,889,069
3,889,070
18J 3,889,067
100R 3,889,071
170R 3,889,072
175.2B 3,889,073
182R 3,889,074

CLASS 180

6.2 3,888,322
6.3 3,888,323
21 3,888,324
65A 3,888,325
65R 3,888,326
68P 3,888,327
79.2R 3,888,328
103 3,888,329
121 3,888,330

CLASS 181

44 3,888,331
53 3,888,332
143 3,888,333

CLASS 188

24 3,888,334
290 3,888,335

CLASS 191

1R 3,888,336

CLASS 192

4C 3,888,337
142 3,888,338

CLASS 195

28R 3,888,736
3,888,737
66R 3,888,738
99 3,888,739
109 3,888,740
139 3,888,741

CLASS 197

55 3,888,339
133R 3,888,340

CLASS 198

19 3,888,341
25 3,888,342
127R 3,888,343
219 3,888,344
230 3,888,345

CLASS 200

5E 3,889,075
16R 3,888,807
48R 3,889,076
61.25 3,889,077
61.64 3,889,078
144B 3,889,079
3,889,080
3,889,081
146R 3,889,082
148B 3,889,083
148R 3,889,084
153R 3,889,085
192 3,889,086
246 3,889,087
268 3,889,098
330 3,889,088
334 3,889,089

CLASS 201

39 3,888,742

CLASS 202

158 3,888,743

CLASS 204

1.5 3,888,744
18R 3,888,745
36 3,888,746
67 3,888,747
108 3,888,748
129 3,888,749
3,888,750
152 3,888,751
159.18 3,888,752
168 3,888,753
195R 3,888,754
272 3,888,755
275 3,888,756
297R 3,888,757
299 3,888,758
3,888,759

CLASS 206

3 3,888,346
315 3,888,347
427 3,888,348
457 3,888,349
531 3,888,350

CLASS 208

48 3,888,760
112 3,888,761
120 3,888,762
139 3,888,763
140 3,888,764

CLASS 209

75 3,888,351
115 3,888,352
352 3,888,765

CLASS 210

36 3,888,766
151 3,888,767
223 3,888,768
227 3,888,769
238 3,888,770
500M 3,888,771

CLASS 211

37 3,888,353
110 3,888,354
123 3,888,355

CLASS 212

15 3,888,356
68 3,888,357

CLASS 213

69 3,888,358

CLASS 214

1BB 3,888,359
3,888,360
1BH 3,888,361
1B 3,888,362
6D 3,888,363
8.5A 3,888,364
16B 3,888,365
83.22 3,888,366
84 3,888,367
86A 3,888,368
3,888,369
356 3,888,370
767 3,888,371
776 3,888,372

CLASS 215

214 3,888,373
216 3,888,374
217 3,888,376
219 3,888,375
249 3,888,377
344 3,888,378

CLASS 219

10.49 3,889,090
10.55E 3,889,091
69R 3,889,092
77 3,889,093
89 3,889,094
121L 3,889,095
229 3,889,096
242 3,889,097
393 3,889,099
3,889,100
527 3,889,101

CLASS 220

4F 3,888,379
81R 3,888,380
86AT 3,888,381
202 3,888,382
265 3,888,383
268 3,888,384
335 3,888,386

CLASS 221

278 3,888,387

CLASS 222

1 3,888,388
23 3,888,389
28 3,888,390
52 3,888,391
108 3,888,392
229 3,888,393
230 3,888,394

CLASS 223

1 3,888,395
99 3,888,396

CLASS 224

35 3,888,397
42.1 3,888,398

CLASS 225

106 3,888,399

CLASS 226

43 3,888,400
109 3,888,401
157 3,888,402
188 3,888,403

CLASS 227

8 3,888,404

CLASS 228

2 3,888,405

CLASS 229

14R 3,888,406
44CB 3,888,407
85 3,888,408

CLASS 232

1C 3,888,409

CLASS 233

6 3,888,410

CLASS 235

61.7R 3,889,102
61.9A 3,889,103
150.2 3,889,104
151.11 3,889,105
151.21 3,889,106
152 3,889,107
3,889,108
153AK 3,889,109
176 3,889,110

CLASS 236

13 3,888,411

CLASS 237

12.3B 3,888,412

CLASS 238

349 3,888,413
3,888,414

CLASS 239

2R 3,888,415
34 3,888,416
97 3,888,417
145 3,888,418
265.19 3,888,419
412 3,888,420
456 3,888,421
512 3,888,422
567 3,888,423
657 3,888,424

CLASS 241

5 3,888,425
3,888,426
46.11 3,888,427
92 3,888,428

CLASS 242

55 3,888,430
55.19A 3,888,429
56R 3,888,480
194 3,888,431
201 3,888,432

CLASS 243

1 3,888,433
38 3,888,434

CLASS 244

58 3,888,435
104FP 3,888,436

CLASS 246

63A 3,888,437

CLASS 248

48 3,888,438
54R 3,888,439
73 3,888,440
3,888,441
98 3,888,442
152 3,888,443
188.5 3,888,444
225 3,888,445
231 3,888,446
235 3,888,447
328 3,888,448
358R 3,888,449
3,888,450
399 3,888,451

CLASS 249

23 3,888,452
82 3,888,453
90 3,888,454
214 3,888,455
219W 3,888,456

CLASS 250

199 3,888,772
237R 3,889,111
264 Re.28,450
265 3,889,112
272 3,889,113
306 3,889,114
307 3,889,115
320 3,889,116
332 3,889,117
341 3,889,118
352 3,889,119
356 3,889,120
359 3,889,121
3,889,122
366 Re.28,451
437 3,889,123
493 3,889,124
515 3,889,125

CLASS 251

14 3,888,457
118 3,888,458
208 3,888,459
315 3,888,460
351 3,888,461

CLASS 252

8.1 3,888,774
3,888,779
8.8 3,888,775
25 3,888,776
37.2 3,888,773
73 3,888,777
79.3 3,888,778
99 3,888,781
106 3,888,782
135 3,888,783
188.3CL 3,888,784
3,888,785
3,888,786
301.1S 3,888,787
309 3,888,788
429B 3,888,789
432 3,888,790
454 3,888,793
455R 3,888,791
462 3,888,792
478 3,888,794
3,888,795
513 3,888,575
518 3,888,796
527 3,888,797
545 3,888,798

CLASS 254

10C 3,888,463
86R 3,888,464

CLASS 259

4 3,888,465
44 3,888,466
148 3,888,467
171 3,888,468
191 3,888,469
3,888,470

CLASS 260

2P 3,888,799
3,888,800
2.5AQ 3,888,803
2.5HB 3,888,804
2.5R 3,888,801
3,888,802
5 3,888,805
17.4BB 3,888,810
17.4ST 3,888,809
18EP 3,888,808
23R 3,888,811
24 3,888,812
29.3 3,888,813
33.6AQ 3,888,814
33.8UB 3,888,806
37SB 3,888,815
3,888,891
39R 3,888,816
45.7PH 3,888,817
45.7R 3,888,820
45.8NT 3,888,821
3,888,822
45.8A 3,888,823
45.8N 3,888,818
3,888,819
45.85B 3,888,825
45.9NC 3,888,824
47EC 3,888,827
47XA 3,888,826
49 3,888,828
76 3,888,830
77.5AM 3,888,831
78L 3,888,832
79.3R 3,888,833
80.7 3,888,834
88.2R 3,888,835
112R 3,888,839
112.5 3,888,836
3,888,837
3,888,838
3,888,840
141 3,888,841
210F 3,888,842
211.5R 3,888,843
214 3,888,844
239BC 3,888,846
239E 3,888,847
239.1 3,888,848
239.3A 3,888,845
239.5 3,888,849
240.9 3,888,850
243R 3,888,851
244R 3,888,852
247.1M 3,888,853
248CS 3,888,854
248C 3,888,855
3,888,856
251QA 3,888,858
251Q 3,888,857
268BC 3,888,860
3,888,861
281 3,888,862
3,888,863
285 3,888,864
288 3,888,865
292 3,888,866
293.8 3,888,867
294.8F 3,888,868
302SD 3,888,869
302S 3,888,870
304 3,888,871
306.8R 3,888,872
307H 3,888,873
308R 3,888,874
314.5 3,888,875
3,888,876
326.5B 3,888,946
327P 3,888,878
327R 3,888,877
329S 3,888,879
340.6 3,888,880
3,888,881
340.7 3,888,882
343.2R 3,888,883
343.9 3,888,884
345.2 3,888,885
346.8 3,888,886
347.7 3,888,887
348A 3,888,888
348.5 3,888,889
369 3,888,890
397.2 3,888,892
404 3,888,893
404.5 3,888,894
429.5 3,888,895
449.5 3,888,896
465D 3,888,899
3,888,902
465E 3,888,897
3,888,898
465R 3,888,900
3,888,901
468D 3,888,904
468E 3,888,903
471A 3,888,905
472 3,888,906
473R 3,888,907
475P 3,888,908
3,888,909
479R 3,888,910
484R 3,888,911
486R 3,888,912
501.1 3,888,916
501.11 3,888,947
501.16 3,888,914
501.19 3,888,913
501.21 3,888,915
504R 3,888,917
513R 3,888,918
514D 3,888,919
515R 3,888,920
525 3,888,921
526N 3,888,922
534S 3,888,923
543F 3,888,924
551S 3,888,925
559A 3,888,926
564R 3,888,927
570.6 3,888,829
570.9 3,888,928
578 3,888,929
606.5P 3,888,930
611A 3,888,931
612R 3,888,932
618F 3,888,934
618R 3,888,933
653.6 3,888,935
659R 3,888,936
667 3,888,937
668A 3,888,938
677AD 3,888,939
683D 3,888,940
829 3,888,941
830TW 3,888,942
836 3,888,943
857PG 3,888,944
876R 3,888,945
878R 3,888,948
897A 3,888,949
933 3,888,950
945 3,888,951
951 3,888,952
977 3,888,953

CLASS 261

18A 3,888,954
99 3,888,955

CLASS 264

5 3,888,956
13 3,888,957
29 3,888,958
32 3,888,959
71 3,888,960
89 3,888,961
122 3,888,962
176R 3,888,963
236 3,888,964

342RE 3,888,965

CLASS 266

4A 3,888,471

CLASS 267

57.1R 3,888,472
102 3,888,473
110 3,888,474
174 3,888,475

CLASS 269

41 3,888,476
82 3,888,477

CLASS 271

8R 3,888,478
22 3,888,479

CLASS 272

83R 3,888,481

CLASS 273

26C 3,888,482
38 3,888,483
80C 3,888,484
94R 3,888,485
105R 3,888,486
130AC 3,888,487
131BA 3,888,488
134AD 3,888,490
134B 3,888,489
136A 3,888,491
186A 3,888,492

CLASS 274

1R 3,888,493
2 3,888,494

CLASS 277

3 3,888,495
117 3,888,496

CLASS 280

11.35K 3,888,499
11.35T 3,888,497
3,888,498
11.37E 3,888,500
47.18 3,888,501
106R 3,888,502
150AB 3,888,503
3,888,504
3,888,505
3,888,508
150SB 3,888,509
150B 3,888,506
150E 3,888,507
166 3,888,510
239 3,888,511
255 3,888,512
421 3,888,513
434 3,888,514
476R 3,888,515
491E 3,888,516
512 3,888,517

CLASS 285

39 3,888,518
55 3,888,519
310 3,888,520
341 3,888,521
3,888,522
382 3,888,523

CLASS 290

1 3,889,126
14 3,889,127

CLASS 291

15 3,888,524

CLASS 292

87 3,888,525
97 3,888,526
213 3,888,527
256.5 3,888,528
259 3,888,529
340 3,888,530

CLASS 293

1 3,888,531
62 3,888,532

CLASS 294

5.5 3,888,533
19R 3,888,534
3,888,535
81SF 3,888,536
93 3,888,537

CLASS 296

3 3,888,538
23D 3,888,539

CLASS 297

384 3,888,540
388 3,888,541

CLASS 299

1 3,888,542
11 3,888,543
25 3,888,544

CLASS 301

63PW 3,888,545

CLASS 303

6C 3,888,546
21CG 3,888,548
21EB 3,888,549
21F 3,888,547
21P 3,888,550
84A 3,888,551
84R 3,888,552

CLASS 307

9 3,889,128
105 3,889,129
121 3,889,130
136 3,889,131
141 3,889,132
239 3,889,133
268 3,889,134
270 3,889,135
295 3,889,136
300 3,889,137

CLASS 308

10 3,888,553
72 3,888,554
138 3,888,555

CLASS 310

6 3,889,138
13 3,889,139
103 3,889,140
154 3,889,141

CLASS 312

1 3,888,556
214 3,888,557
216 3,888,558

CLASS 313

44 3,889,142
94 3,889,143
99 3,889,144
408 3,889,145
414 3,889,146
500 3,889,147

CLASS 315

3.5 3,889,148
3,889,149
58 3,889,150
170 3,889,151
205 3,889,152
209R 3,889,153
267 3,889,154
369 3,889,155
408 3,889,156

CLASS 317

4 3,889,157
12A 3,889,158
31 3,889,159
96 3,889,160
148.5B 3,889,161
148.5R 3,889,162
262S 3,889,163

CLASS 318

115 3,889,165
116 3,889,166
227 3,889,167
341 3,889,168
571 3,889,169
640 3,889,164

CLASS 320

14 3,889,170
31 3,889,171
39 3,889,172

CLASS 321

2 3,889,173
9R 3,889,174
27R 3,889,175

CLASS 323

8 3,889,176
17 3,889,177
22SC 3,889,178

CLASS 324

3 3,889,179
30R 3,889,183
33 3,889,180
41 3,889,181
58.5A 3,889,182
62 3,889,184
72 3,889,185
83D 3,889,186
114 3,889,187
158T 3,889,188
186 3,889,189

CLASS 325

16 3,889,190
307 3,889,191
348 3,889,192
419 3,889,193
436 3,889,194
455 3,889,196
464 3,889,195

CLASS 328

55 3,889,197
59 3,889,198
163 3,889,199
3,889,200

CLASS 330

21 3,889,201
51 3,889,202
56 3,889,203

CLASS 331

1A 3,889,204
17 Re.28,452
41 3,889,205
45 3,889,206
94.5G 3,889,208
3,889,209
94.5S 3,889,207
109 3,889,210
116R 3,889,211

CLASS 333

30R 3,889,212
73R 3,889,214
73W 3,889,213

CLASS 335

6 3,889,215
106 3,889,216
212 3,889,217
213 3,889,218
234 3,889,219
306 3,889,220

CLASS 337

15 3,889,221
244 3,889,222

CLASS 338

195 3,889,223

CLASS 339

46 3,888,559
59R 3,888,560

CLASS 340

2 3,889,224
3C 3,889,225
5H 3,889,226
6R 3,889,227
15.5CP 3,889,229
17 3,889,230
18FM 3,889,228
21 3,889,231
52H 3,889,232
146.1R 3,889,235
146.3MA 3,889,234
146.3F 3,889,233
172.5 3,889,236
3,889,237
3,889,238
3,889,239
3,889,240
3,889,241
3,889,242
3,889,243
173CR 3,889,244
173RC 3,889,245
174ZB 3,889,246
244C 3,889,247
249 3,889,248
258R 3,889,249
274 3,889,250
279 3,889,251
313 3,889,252
323 3,889,253
347CC 3,889,255
347NT 3,889,254
384E 3,889,256

CLASS 343

6TV 3,889,257
6.5LC 3,889,258
7ED 3,889,259
7.3 3,889,260
14 3,889,261
18B 3,889,262
103 3,889,263
105R 3,889,264
3,889,265
112R 3,889,266
113R 3,889,267
703 3,889,268

CLASS 346

1 3,889,269
3,889,270
3,889,271
3,889,272
33R 3,889,273
74J 3,889,274
136 3,889,275

CLASS 350

3.5 3,888,561
7 3,888,562
85 3,888,563
138 3,888,564
160LC 3,888,566
160 3,888,565
229 3,888,567
252 3,888,568

CLASS 351

6 3,888,569

CLASS 352

29 3,888,570
87 3,888,571
3,888,572
92 3,888,780
166 3,888,573
194 3,888,574

CLASS 353

29 3,888,462
76 3,888,576

CLASS 354

31 3,889,276
36 3,889,277
50 3,889,278
79 3,889,279
86 3,889,280
109 3,889,281
196 3,889,282
272 3,889,283

CLASS 355

3DD 3,888,578
3R 3,888,577
14 3,888,579
38 3,888,580
64 3,888,581
69 3,888,582
71 3,888,583
75 3,888,584
3,888,585
78 3,888,586
112 3,888,587

CLASS 356

5 3,888,588
28 3,888,589
101 3,888,590
114 3,888,591
155 3,888,592
164 3,888,593
226 3,888,594

CLASS 357

23 3,889,287
30 3,889,284
67 3,889,286
72 3,889,285

CLASS 358

11 3,889,288

CLASS 360

6 3,889,289
11 3,888,385
12 3,889,290
3,889,291
15 3,889,292
18 3,889,293
52 3,889,294
123 3,889,295

CLASS 403

14 3,888,595
314 3,888,596
326 3,888,597
372 3,888,598

CLASS 404

69 3,888,599
117 3,888,600

CLASS 416

144 3,888,601
198 3,888,602

CLASS 417

25 3,888,603
269 3,888,604
279 3,888,605

CLASS 418

179 3,888,606
206 3,888,607

CLASS 423

150 3,888,966
206 3,888,967
242 3,888,968
243 3,888,969
244 3,888,970
307 3,888,971
338 3,888,972
493 3,888,973
580 3,888,974

CLASS 424

15 3,888,975
44 3,888,976
98 3,888,977
199 3,888,978
211 3,888,979
230 3,888,980
242 3,888,981
245 3,888,982
87 3,888,611
130 3,888,612
160 3,888,613
224 3,888,614
246 3,888,615
3,888,616
296 3,888,617
389 3,888,618
436R 3,888,619

CLASS 426

27 3,888,997
62 3,888,996
67 3,888,998
74 3,889,007
77 3,888,999
84 3,889,000
126 3,888,224
234 3,889,009
262 3,888,859
276 3,889,010
500 3,889,012
513 3,889,013
534 3,889,008
565 3,889,001
576 3,889,002
580 3,889,003
582 3,889,004
585 3,889,005
604 3,889,011
656 3,889,006

CLASS 427

4 3,889,014
21 3,889,015
66 3,889,016
160 3,889,017
209 3,889,018
243 3,889,024
251 3,889,019
297 3,889,020
376 3,889,021

CLASS 428

34 3,889,026
3,889,027
88 3,889,028
212 3,889,029
215 3,889,030
216 3,889,031
218 3,889,032
227 3,889,035
262 3,889,022
302 3,889,037
323 3,889,033
361 3,889,038
372 3,889,034
383 3,889,036
404 3,889,039
412 3,889,040
413 3,889,025
429 3,889,023
472 3,889,041

CLASS 431

291 3,888,620

CLASS 432

19 3,888,621
36 3,888,622
251 3,888,983
270 3,888,984
275 3,888,985
3,888,986
278 3,888,987
279 3,888,988
280 3,888,989
283 3,888,990
285 3,888,991
298 3,888,992
309 3,888,993
342 3,888,994
358 3,888,995

CLASS 425

4C 3,888,608
72 3,888,609
3,888,610

D2—	275	235,283			235,301			235,319		R	235,335			235,354	D56—	A	235,372
D6—	37	235,284		23	235,302			235,375			235,337	D29—	19R	235,355		4B	235,373
	42	235,285		43	235,303		78	235,321	D22—	8	235,339	D32—	2	235,356	D60—	1	235,374
	56	235,286		101	235,304	D12—	67	235,320	D23—	2	235,340	D34—	5DD	235,360	D70—		235,376
	59	235,287		137	235,305		114	235,323		29	235,341		GP	235,358	D83—	E	235,377
		235,288		138	235,306			235,324		41	235,342		SS	235,359		F	235,378
	71	235,289		149	235,307		115	235,322		43	235,343		ST	235,357		T	235,379
	95	235,290	D8—	257	235,308			235,325		58	235,344		VV	235,361			235,380
	127	235,291	D9—	8	235,309		155	235,326		78	235,345		K	235,362			235,381
	161	235,292		10	235,310		156	235,327		122	235,346		15VV	235,363	D86—	10F	235,383
	175	235,293		107	235,311		209	235,329		139	235,347		ZZ	235,366	D87—	1D	235,382
		235,294		127	235,312			235,330	D26—	1A	235,348		A	235,365		5G	235,384
	184	235,295		171	235,313			235,331		3C	235,349	D35—	3	235,364		8	235,385
	186	235,296		222	235,314		211	235,328		14D	235,351	D45—	10	235,367	D88—	3A	235,386
	194	235,297		258	235,315			235,333			235,352	D49—	1	235,369	D92—	15	235,338
		235,298		291	235,316			235,334		G	235,350	D54—		235,370			235,387
D7—	2	235,299	D10—	46	235,317		217	235,332	D27—	36	235,368	D55—	D	235,371	D94—	3B	235,388
	3	235,300		66	235,318	D13—	1M	235,336		39	235,353						

CLASSIFICATION OF PLANTS

P. —	18	3,729	P. —	20	3,727	P. —	26	3,728			

GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

1 : 3,888,041
3,888,069
3,888,179
3,888,197
3,888,345
3,888,346
3,888,418
3,888,561
3,888,628
3,889,155

4 : 3,888,025
3,888,056
3,888,121
3,889,109
3,889,287

5 : 3,888,229
3,888,230
3,888,327
3,888,714

6 : Re.28,452
3,887,949
3,887,950
3,887,967
3,887,973
3,887,991
3,888,007
3,888,034
3,888,043
3,888,060
3,888,113
3,888,117
3,888,127
3,888,139
3,888,154
3,888,155
3,888,159
3,888,174
3,888,180
3,888,181
3,888,190
3,888,201
3,888,211
3,888,217
3,888,218
3,888,233
3,888,238
3,888,239
3,888,243
3,888,245
3,888,254
3,888,255
3,888,264
3,888,271
3,888,285
3,888,302
3,888,330
3,888,362
3,888,363
3,888,376
3,888,381
3,888,385
3,888,395
3,888,415
3,888,417
3,888,463
3,888,467
3,888,483
3,888,486
3,888,488
3,888,490
3,888,494
3,888,496
3,888,501
3,888,525
3,888,526
3,888,531
3,888,534
3,888,538
3,888,539
3,888,572
3,888,573
3,888,593
3,888,611
3,888,642
3,888,675
3,888,691
3,888,696
3,888,708
3,888,715
3,888,721
3,888,725
3,888,739
3,888,760
3,888,782
3,888,866
3,888,868
3,888,879
3,888,888
3,888,893
3,888,906
3,888,952
3,888,975
3,888,987
3,888,992
3,888,995
3,889,009
3,889,046
3,889,047
3,889,055
3,889,063
3,889,065
3,889,067
3,889,070
3,889,071
3,889,083
3,889,095
3,889,103
3,889,121
3,889,132
3,889,134
3,889,139
3,889,147
3,889,169
3,889,170
3,889,174
3,889,178
3,889,179
3,889,200
3,889,207
3,889,212
3,889,231
3,889,232
3,889,248
3,889,253
3,889,257
3,889,260
3,889,264
3,889,268
3,889,295
8 : 3,888,014
3,888,099
3,888,132
3,888,140
3,888,199
3,888,279
3,888,309
3,888,456
3,888,723
3,888,917
3,889,068
3,889,189
9 : 3,888,002
3,888,006
3,888,010
3,888,078
3,888,081
3,888,092
3,888,146
3,888,151
3,888,291
3,888,298
3,888,301
3,888,334
3,888,399
3,888,560
3,888,565
3,888,590
3,888,602
3,888,768
3,888,778
3,888,801
3,888,802
3,888,856
3,888,941
3,888,988
3,889,002
3,889,015
3,889,019
3,889,032
3,889,164
3,889,266
10 : 3,888,083
3,888,586
3,888,672
3,888,788
3,888,790
3,888,831
3,888,872
3,888,890
3,888,894
3,888,897
3,888,949
3,888,965
11 : 3,888,185
3,888,347
12 : 3,888,023
3,888,055
3,888,075
3,888,089
3,888,101
3,888,209
3,888,266
3,888,429
3,888,529
3,888,552
3,888,571
3,888,695
3,888,854
3,888,977
3,889,013
3,889,185
3,889,190
13 : 3,888,186
3,888,196
3,888,286
3,888,313
3,888,443
3,888,466
3,889,186
3,889,291
15 : 3,888,068
3,888,134
3,888,204
16 : 3,888,191
3,888,517
3,888,557
3,888,733
3,888,804
17 : Re.28,443
Re.28,451
3,887,964
3,888,005
3,888,008
3,888,018
3,888,029
3,888,030
3,888,033
3,888,103
3,888,128
3,888,129
3,888,156
3,888,187
3,888,188
3,888,234
3,888,249
3,888,289
3,888,303
3,888,316
3,888,357
3,888,359
3,888,375
3,888,378
3,888,384
3,888,397
3,888,400
3,888,404
3,888,406
3,888,428
3,888,433
3,888,453
3,888,468
3,888,545
3,888,555
3,888,597
3,888,630
3,888,633
3,888,652
3,888,654
3,888,671
3,888,690
3,888,716
3,888,729
3,888,738
3,888,743
3,888,762
3,888,763
3,888,764
3,888,789
3,888,808
3,888,814
3,888,816
3,888,882
3,888,883
3,888,905
3,888,935
3,888,939
3,888,960
3,888,973
3,888,996
3,889,069
3,889,072
3,889,097
3,889,136
3,889,156
3,889,194
3,889,256
3,889,288
18 : 3,887,996
3,887,997
3,887,998
3,888,093
3,888,111
3,888,170
3,888,192
3,888,225
3,888,248

3,888,322
3,888,373
3,888,387
3,888,405
3,888,426
3,888,445
3,888,472
3,888,493
3,888,530
3,888,638
3,888,651
3,888,702
3,888,741
3,888,766
3,888,844
3,889,036
3,889,158
19 : Re.28,448
3,887,989
3,888,037
3,888,058
3,888,189
3,888,287
3,888,390
3,888,510
20 : 3,887,990
3,888,135
3,888,265
3,888,408
3,888,532
3,888,618
3,888,722
3,888,848
21 : 3,887,960
3,888,166
3,888,171
3,888,473
3,888,474
3,888,959
3,889,099
3,889,100
22 : 3,887,985
3,888,136
3,888,306
3,888,442
3,888,596
3,888,761
3,888,793
3,888,918
3,888,966
3,889,056
3,889,089
23 : 3,889,018
24 : 3,887,946
3,887,952
3,887,971
3,887,986
3,888,017
3,888,102
3,888,119
3,888,122
3,888,176
3,888,202
3,888,231
3,888,240
3,888,260
3,888,275
3,888,524
3,888,562
3,888,648
3,888,682
3,888,683
3,888,684
3,888,698
3,889,053
3,889,108
25 : 3,887,984
3,887,987
3,888,016
3,888,107
3,888,116
3,888,284
3,888,337
3,888,351
3,888,380
3,888,402
3,888,519
3,888,568
3,888,570
3,888,598
3,888,657
3,888,661
3,888,664
3,888,668
3,888,669
3,888,719
3,888,875
3,888,876
3,888,946
3,889,125
3,889,142
3,889,153
3,889,171
3,889,196

3,889,208
3,889,230
3,889,249
3,889,250
3,889,252
3,889,255
3,889,263
3,889,280
26 : Re.28,445
Re.28,446
3,887,956
3,888,021
3,888,035
3,888,036
3,888,044
3,888,046
3,888,091
3,888,143
3,888,219
3,888,221
3,888,223
3,888,226
3,888,227
3,888,228
3,888,259
3,888,269
3,888,296
3,888,315
3,888,321
3,888,323
3,888,331
3,888,340
3,888,341
3,888,344
3,888,355
3,888,361
3,888,411
3,888,420
3,888,439
3,888,440
3,888,441
3,888,458
3,888,459
3,888,469
3,888,503
3,888,506
3,888,509
3,888,523
3,888,541
3,888,546
3,888,613
3,888,656
3,888,663
3,888,720
3,888,746
3,888,752
3,888,777
3,888,833
3,888,847
3,888,869
3,888,904
3,888,916
3,888,919
3,888,943
3,888,982
3,889,023
3,889,088
3,889,101
3,889,111
3,889,141
3,889,242
3,889,285
27 : 3,888,040
3,888,050
3,888,214
3,888,261
3,888,278
3,888,352
3,888,606
3,888,891
3,888,912
3,888,970
3,889,102
3,889,184
3,889,237
28 : 3,888,152
3,888,476
3,889,007
29 : 3,888,011
3,888,084
3,888,144
3,888,455
3,888,516
3,888,626
3,888,627
3,888,703
3,888,839
3,888,881
3,888,903
3,888,915
3,888,925
30 : 3,888,694
3,888,799
31 : 3,888,096

3,888,446
3,888,500
32 : 3,888,425
3,888,485
33 : 3,888,003
3,888,054
3,888,388
3,888,639
34 : Re.28,444
3,887,966
3,887,981
3,888,004
3,888,020
3,888,022
3,888,053
3,888,064
3,888,065
3,888,088
3,888,175
3,888,177
3,888,182
3,888,200
3,888,212
3,888,235
3,888,244
3,888,246
3,888,251
3,888,263
3,888,317
3,888,350
3,888,421
3,888,537
3,888,605
3,888,647
3,888,676
3,888,706
3,888,748
3,888,773
3,888,779
3,888,785
3,888,786
3,888,811
3,888,817
3,888,820
3,888,825
3,888,836
3,888,846
3,888,849
3,888,852
3,888,853
3,888,855
3,888,864
3,888,870
3,888,886
3,888,895
3,888,901
3,888,902
3,888,911
3,888,920
3,888,933
3,888,934
3,888,937
3,888,961
3,888,962
3,888,986
3,888,999
3,889,008
3,889,024
3,889,086
3,889,130
3,889,150
3,889,151
3,889,191
3,889,197
3,889,199
3,889,221
3,889,272
3,889,284
3,889,293
35 : 3,888,124
3,888,535
36 : 3,887,963
3,887,994
3,888,015
3,888,039
3,888,045
3,888,095
3,888,098
3,888,105
3,888,148
3,888,172
3,888,205
3,888,208
3,888,247
3,888,326
3,888,354
3,888,412
3,888,416
3,888,423
3,888,452
3,888,465
3,888,471
3,888,481
3,888,492

3,888,504
3,888,567
3,888,569
3,888,577
3,888,579
3,888,581
3,888,582
3,888,584
3,888,585
3,888,587
3,888,591
3,888,601
3,888,615
3,888,616
3,888,619
3,888,622
3,888,632
3,888,667
3,888,670
3,888,678
3,888,707
3,888,718
3,888,753
3,888,776
3,888,798
3,888,815
3,888,819
3,888,822
3,888,824
3,888,859
3,888,892
3,888,896
3,888,926
3,888,963
3,888,989
3,888,997
3,889,000
3,889,001
3,889,003
3,889,030
3,889,042
3,889,045
3,889,052
3,889,054
3,889,057
3,889,131
3,889,154
3,889,161
3,889,176
3,889,183
3,889,203
3,889,206
3,889,241
3,889,243
3,889,292
37 : 3,888,250
3,888,367
3,888,422
3,888,438
3,888,460
3,888,482
3,888,533
3,888,755
3,889,014
3,889,073
38 : 3,888,372
3,888,382
39 : 3,887,953
3,887,965
3,888,048
3,888,062
3,888,072
3,888,097
3,888,133
3,888,142
3,888,162
3,888,241
3,888,268
3,888,283
3,888,288
3,888,320
3,888,329
3,888,338
3,888,348
3,888,349
3,888,391
3,888,392
3,888,396
3,888,430
3,888,448
3,888,489
3,888,511
3,888,513
3,888,521
3,888,522
3,888,583
3,888,686
3,888,686
3,888,687
3,888,699
3,888,713
3,888,781
3,888,805
3,888,823

3,888,867
3,888,942
3,888,980
3,888,998
3,889,025
3,889,039
3,889,048
3,889,117
3,889,162
3,889,166
3,889,286
3,889,289
40 : Re.28,449
3,887,983
3,888,100
3,888,312
3,888,319
3,888,564
3,888,635
3,888,931
3,888,940
3,889,049
3,889,294
41 : 3,888,149
3,888,409
3,888,435
3,888,512
3,888,780
42 : Re.28,447
3,887,970
3,887,974
3,887,975
3,887,976
3,887,982
3,887,999
3,888,027
3,888,063
3,888,067
3,888,090
3,888,106
3,888,120
3,888,145
3,888,158
3,888,168
3,888,178
3,888,183
3,888,195
3,888,206
3,888,210
3,888,232
3,888,280
3,888,290
3,888,295
3,888,343
3,888,369
3,888,379
3,888,398
3,888,478
3,888,487
3,888,491
3,888,515
3,888,520
3,888,559
3,888,595
3,888,599
3,888,620
3,888,624
3,888,636
3,888,658
3,888,659
3,888,662
3,888,693
3,888,701
3,888,742
3,888,747
3,888,749
3,888,750
3,888,772
3,888,774
3,888,783
3,888,794
3,888,795
3,888,800
3,888,803
3,888,807
3,888,813
3,888,858
3,888,924
3,888,932
3,888,957
3,888,976
3,889,017
3,889,027
3,889,029
3,888,257
3,888,368
3,888,475
47 : 3,889,152
48 : Re.28,450
3,887,962
3,888,038
3,888,071
3,888,109

3,888,114
3,888,115
3,888,137
3,888,215
3,888,273
3,888,281
3,888,307
3,888,308
3,888,310
3,888,311
3,888,318
3,888,358
3,888,454
3,888,457
3,888,527
3,888,544
3,888,617
3,888,674
3,888,709
3,888,710
3,888,806
3,888,880
3,888,922
3,888,936
3,889,050
3,889,062
3,889,066
3,889,113
3,889,119
3,889,120
3,889,173
3,889,210
3,889,228
3,889,229
3,889,245
3,889,258
49 : 3,888,019
3,888,419
3,889,064
3,889,107
3,889,122
3,889,290
50 : 3,889,188
51 : 3,888,262
3,888,410
3,888,477
3,888,536
3,888,734
3,888,821
3,888,944
3,888,953
3,889,038
3,889,082
3,889,104
3,889,105
3,889,149
3,889,181
3,889,182
3,889,217
53 : 3,887,980
3,888,108
3,888,436
3,888,731
3,888,744
3,889,020
3,889,044
3,889,163
3,889,226
54 : 3,888,908
3,889,213
55 : 3,888,057
3,888,118
3,888,203
3,888,366
3,888,444
3,888,450
3,888,625
3,888,700
3,888,860
3,888,861
3,888,873
56 : 3,888,242
3,889,079
3,889,080
3,889,081
3,889,084
3,889,085
3,889,087
3,889,090
3,889,093
3,889,106
3,889,118
3,889,177
3,889,201
3,889,216
3,889,224
3,889,274
3,889,275
44 : 3,888,013
3,888,032
3,888,645
45 : 3,887,969

4 :	235,306		235,353		235,369		235,331		235,345		235,387
	235,384		235,354		235,379		235,333		235,378	47 :	235,289
6 :	235,297		235,359		235,380		235,334	39 :	235,291		235,337
	235,298	12 :	235,307		235,381	34 :	235,318		235,299		235,340
	235,309	17 :	235,302		235,383		235,319		235,312	48 :	235,283
	235,327		235,310	24 :	235,335		235,367		235,316		235,288
	235,356		235,313		235,355		235,375		235,341		235,364
	235,357		235,336	25 :	235,303		235,376		235,344	49 :	235,372
	235,361		235,346	26 :	235,328	36 :	235,292		235,360	51 :	235,285
	235,362		235,350		235,370		235,293		235,388	53 :	235,323
	235,365		235,351		235,371		235,294	42 :	235,300		235,324
	235,366		235,352		235,382		235,296		235,301	55 :	235,295
8 :	235,326	18 :	235,284	27 :	235,322		235,304		235,348		235,311
9 :	235,315		235,287		235,325		235,342		235,385		235,347
	235,317		235,320		235,329		235,343	45 :	235,290		235,374
	235,332	20 :	235,308		235,330						

PLANT PATENTS

6 : 3,727	3,728	3,729			

U. S. GOVERNMENT PRINTING OFFICE : O - 1975

U.S. DEPARTMENT OF COMMERCE
Rogers C. B. Morton, *Secretary*

PATENT AND TRADEMARK OFFICE
C. Marshall Dann, *Commissioner*